

# Volume 1 of 2 Project Manual

Master Plan Phase III Renovations and Additions
Norwalk Community College
188 Richards Avenue

Norwalk, CT

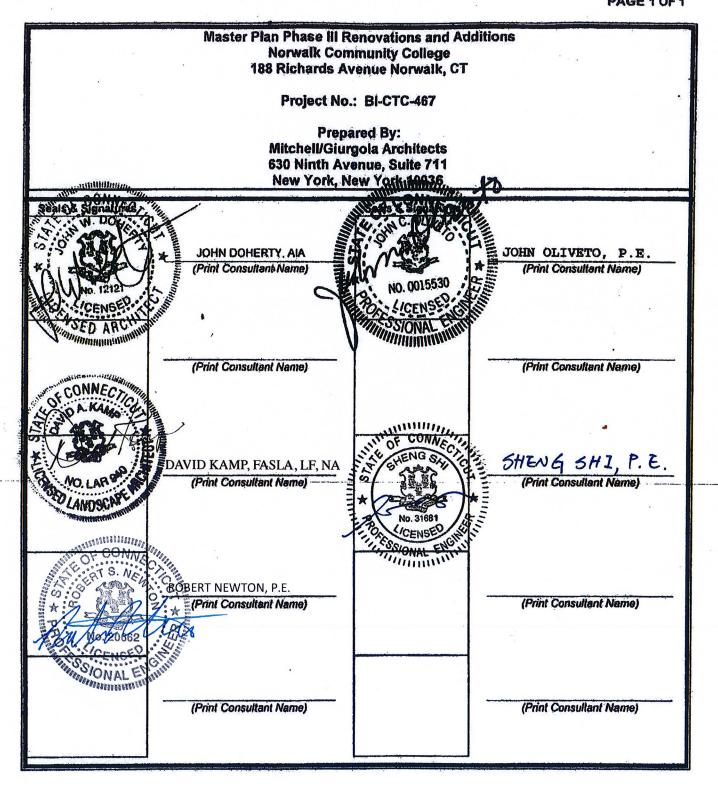
Project No.: BI-CTC-467

Prepared By:
Mitchell Giurgola Architects, LLP
630 Ninth Avenue, Suite 711
New York, New York
10036

**Melody A. Currey - Commissioner** 

State of Connecticut
Department of Administrative Services
Construction Services
Office of Legal Affairs, Policy, and Procurement
450 Columbus Boulevard, Suite 1302
Hartford, CT 06103

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A7.50T	THEATER INTERIOR BALUSTRADE SECTION DETAILS
A7.51T	THEATER INTERIOR HOUSE SECTION DETAILS
A7.52T	THEATER INTERIOR HOUSE PLAN DETAILS
A7.53T	THEATER INTERIOR PLAN DETAILS AT COLUMNS
A7.60T	THEATER STAGE DETAILS
A7.61T	THEATER INTERIOR DETAILS
A7.70T	THEATER INTERIOR TICKET ROOM BACK OF HOUSE DETAILS
A7.71T	THEATER INTERIOR GREEN & DRESSING ROOM DETAILS
A8.01T	THEATER FIRST FLOOR RCP
A8.02T	THEATER SECOND FLOOR RCP
A6.30	ROOF DETAILS
A7.00	INTERIOR COLOR SCHEDULE
A7.50	INTERIOR PARTITION TYPES
A7.51	TYPICAL INTERIOR DETAILS
A7.80	SIGNAGE
A8.10	CEILING DETAILS
A9.50	DOOR SCHEDULE
FS.101	STUDENT CENTER EQUIPMENT PLAN
FS.102	STUDENT CENTER EQUIPMENT SCHEDULE & NOTES
FS.103	STUDENT CENTER UTILITY CONNECTIONS PLAN & NOTES
FS.104	STUDENT CENTER UTILITY CONNECTIONS PLAN & NOTES
FS.105	STUDENT CENTER UTILITY CONNECTIONS PLAN & NOTES
FS.106	STUDENT CENTER BUILT-IN LOAD CENTERS/ELEC. PANELS
FS.107	HOOD INFORMATION AND DETAILS
FS.108	ELEVATIONS & DETAILS
FS.109	ELEVATIONS & DETAILS

FS.110	ELEVATIONS & DETAILS
S0.01	GENERAL NOTES 1
S0.01	GENERAL NOTES 2
S0.02 S0.03	DEMOLITION NOTES
S0.04	DESIGN CRITERIA & SNOW LOAD DIAGRAMS
S1.00S	STUDENT CENTER ESTIMATED STRUCTURAL FILL SECTIONS
S1.003	STUDENT CENTER ESTIMATED STRUCTURAL FILE SECTIONS  STUDENT CENTER FOUNDATION PLAN
S1.21S	STUDENT CENTER FOUNDATION SECTIONS
S2.02S	STUDENT CENTER SECOND FLOOR FRAMING PLAN
S2.03S	STUDENT CENTER ROOF FLOOR FRAMING PLAN
S3.01S	STUDENT CENTER STAIR PLAN AND SECTIONS
S4.00S	STUDENT CENTER FRAME ELEVATIONS
S5.00S	STUDENT CENTER COLUMN SCHEDULE
\$7.00S	STUDENT CENTER SUPERSTRUCTURE SECTIONS 1
S7.00S	STUDENT CENTER SUPERSTRUCTURE SECTIONS 2
S0.10T	THEATER FIRST FLOOR DEMO PLAN
S0.101	THEATER SECOND FLOOR DEMO PLAN
S0.111	THEATER ROOF DEMO PLAN
S0.121	THEATER DEMO SECTIONS
S1.02T	THEATER FOUNDATION PLAN
S1.22T	THEATER FOUNDATION SECTIONS 1
S1.23T	THEATER FOUNDATION SECTIONS 2
S2.11T	THEATER FIRST FLOOR PLAN
S2.12T	THEATER SECOND FLOOR FRAMING PLAN
S2.13T	THEATER ROOF FRAMING PLAN
S3.11T	THEATER SECTIONS
S5.10T	THEATER COLUMN SCHEDULE
S7.10T	THEATER SUPERSTRUCTURE SECTIONS 1
S7.11T	THEATER SUPERSTRUCTURE SECTIONS 2
\$7.20T	THEATER SUPERSTRUCTURE SECTIONS 3
S1.11	FOUNDATION TYPICAL DETAILS 1
S1.12	FOUNDATION TYPICAL DETAILS 2
S1.13	FOUNDATION TYPICAL DETAILS 3
S6.00	SUPERSTRUCTURE TYPICAL DETAILS 1
S6.01	SUPERSTRUCTURE TYPICAL DETAILS 2
S6.02	SUPERSTRUCTURE TYPICAL DETAILS 3
S6.03	SUPERSTRUCTURE TYPICAL DETAILS 4
S6.04	SUPERSTRUCTURE TYPICAL MASONRY DETAILS
G0.01	DRAWING LIST
G0.02	SYMBOLS & ABBREVIATIONS
M1.00	MECHANICAL NOTES AND SYMBOLS
M1.01S	STUDENT CENTER 1ST & 2ND FL. DEMO. PLAN - MECHANICAL
M2.01S	STUDENT CENTER FIRST FLOOR PLAN – MECHANICAL
M2.02S	STUDENT CENTER SECOND FLOOR PLAN – MECHANICAL
M2.03S	STUDENT CENTER ROOF PLAN – MECHANICAL
M3.00S	WEST CAMPUS PARTIAL BASEMENT FLOOR PLAN – MECHANICAL
M1.01T	THEATER 1ST & 2ND FL. DEMO. FLOOR PLAN - MECHANICAL
M2.01T	THEATER FIRST FLOOR PLAN – MECHANICAL
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M2.02T	THEATER SECOND FLOOR PLAN – MECHANICAL
M2.03T	THEATER ROOF PLAN – MECHANICAL
M4.01	MECHANICAL FLOW & CONTROL DIAGRAMS
M4.02	MECHANICAL FLOW & CONTROL DIAGRAMS
M5.01	MECHANICAL DETAILS
M5.02	MECHANICAL DETAILS
M5.03	MECHANICAL DETAILS
M5.04	MECHANICAL DETAILS
M5.05	MECHANICAL DETAILS
M5.06	MECHANICAL DETAILS
M6.01	MECHANICAL SCHEDULES
M6.02	MECHANICAL SCHEDULES
P1.00	PLUMBING NOTES AND SYMBOLS
P1.01S	STUDENT CENTER 1ST & 2ND FL. DEMO. PLANS - PLUMBING
P2.01S	STUDENT CENTER FIRST FLOOR PLAN – PLUMBING
P2.02S	STUDENT CENTER SECOND FLOOR PLAN – PLUMBING
P2.03S	STUDENT CENTER ROOF PLAN – PLUMBING
P3.00S	WEST CAMPUS PARTIAL BASEMENT FLOOR PLAN – PLUMBING
P3.01S	STUDENT CENTER ENLARGED UNDERGROUND KIT. FL. PLAN - PLUMBING
P3.02S	STUDENT CENTER KITCHEN PART PLAN - PLUMBING
P4.01S	STUDENT CENTER GAS RISER DIAGRAM - PLUMBING
P1.01T	THEATER 1ST & 2ND FL DEMOLITION PLANS - PLUMBING
P2.01T	THEATER FIRST FLOOR PLAN – PLUMBING
P2.02T	THEATER SECOND FLOOR PLAN – PLUMBING
P2.03T	THEATER ROOF PLAN – PLUMBING
FP1.00	FIRE PROTECTION SCHEDULES, NOTES AND LEGEND
FP2.01S	STUDENT CENTER FIRST FLOOR PLAN – FIRE PROTECTION
FP2.02S	STUDENT CENTER SECOND FLOOR PLAN – FIRE PROTECTION
FP3.00S	WEST CAMPUS PARTIAL BASEMENT FLOOR PLAN - FIRE PROTECTION
FP1.01T	THEATER FIRST FLOOR DEMO. PLAN – FIRE PROTECTION
FP1.02T	THEATER SECOND FLOOR DEMO. PLAN - FIRE PROTECTION
FP2.01T	THEATER FIRST FLOOR PLAN – FIRE PROTECTION
FP2.02T	THEATER SECOND FLOOR PLAN – FIRE PROTECTION
F4.00	ELECTRICAL CENERAL NOTES AND SYMPOLS
E1.00	ELECTRICAL GENERAL NOTES AND SYMBOLS
E1.01S	STUDENT CENTER FIRST ELOOP PLAN - POWER & LIGHTING
E2.01S	STUDENT CENTER FIRST FLOOR PLAN - POWER
E2.02S	STUDENT CENTER BOOK BLAN DOWER
E2.03S	STUDENT CENTER ROOF PLAN – POWER
E3.00S	WEST CAMPUS PARTIAL BASEMENT FLOOR PLAN – POWER
E3.01S	STUDENT CENTER KITCHEN EQUIPMENT PLAN - POWER  STUDENT CENTER SCHEDULES AND RISER DRAWINGS
E4.00S E4.01S	KITCHEN SCHEDULES - POWER
E5.00S	STUDENT CENTER ELECTRICAL DETAILS
	STUDENT CENTER ELECTRICAL DETAILS  STUDENT CENTER FIRST FLOOR PLAN – LIGHTING
E8.01S	
E8.02S E1.01T	STUDENT CENTER SECOND FLOOR PLAN - LIGHTING  THEATER FIRST & ROOF DEMO – POWER & LIGHTING
E1.011	THEATER FIRST & ROOF DEMO – POWER & LIGHTING  THEATER FIRST FLOOR PLAN – POWER
E2.011	THEATER SECOND FLOOR PLAN – POWER
EZ.UZ I	ITILATEN SECOND FLOOR FLAIN - FOWER

E4.00T	THEATER SCHEDULES AND RISER DRAWINGS
E5.00T	THEATER ELECTRICAL DETAILS
E8.01T	THEATER FIRST FLOOR PLAN – LIGHTING
E8.02T	THEATER SECOND FLOOR PLAN – LIGHTING
E4.01	FIRE ALARM RISER DIAGRAMS
E5.01	ELECTRICAL DETAILS
E5.02	ELECTRICAL DETAILS
L3.02	ELLO TRIONE DE TAILO
AV0.01	AUDIO VIDEO SYSTEMS GENERAL NOTES
AV0.30S	AUDIO VIDEO SYSTEMS STUDENT CENTER
AV1.10S	STUDENT CENTER FIRST FLOOR PLAN AV DEVICE LAYOUT
AV3.00S	AUDIO VIDEO SYSTEMS PANEL DETAILS
AV3.01S	STUDENT CENTER SECTION AV DEVICES
AV4.00S	AUDIO VIDEO SYSTEMS RACK DETAILS
AV0.31T	AUDIO VIDEO SYSTEMS THEATER SIGNAL FLOW
AV0.32T	AUDIO VIDEO SYSTEMS THEATER SIGNAL FLOW
AV1.30T	THEATER FIRST FLOOR PLAN AV DEVICE LAYOUT
AV1.31T	THEATER SECOND FLOOR PLAN AV DEVICE LAYOUT
AV1.41T	THEATER ELEVATIONS AUDIO VIDEO ARCHITECTURAL DETAILS
AV3.01T	AUDIO VIDEO SYSTEMS PANEL DETAILS
AV3.02T	AUDIO VIDEO SYSTEMS PANEL DETAILS
AV3.03T	AUDIO VIDEO SYSTEMS PANEL DETAILS
AV3.04T	AUDIO VIDEO SYSTEMS PANEL DETAILS
AV3.31T	THEATER SECTION AV DEVICES
AV4.01T	AUDIO VIDEO SYSTEMS RACK DETAILS
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T0.00	TELECOM NOTES AND SYMBOLS
T2.01S	STUDENT CENTER LEVEL 1 TELECOM PLAN
T2.02S	STUDENT CENTER LEVEL 2 TELECOM PLAN
T3.10S	TELECOM ENLARGED PLAN IT ROOM 160
T5.10S	STUDENT CENTER TELECOM RISER
T2.01T	THEATER STAGE LEVEL TELECOM PLAN
T2.02T	THEATER LEVEL 2 TELECOM PLAN
T4.10T	THEATER TELECOM ROUTE OVERVIEW
T4.11T	THEATER TELECOM ROUTE DETAILS
SC.01S	STUDENT CENTER 1ST FL PLAN SECURITY DEVICE LOCATIONS
SC.02S	STUDENT CENTER 2ND FL PLAN SECURITY DEVICE LOCATIONS
SC.01T	THEATER 1ST FL. PLAN SECURITY DEVICE LOCATIONS
SC.02T	THEATER 2ND FL. PLAN SECURITY DEVICE LOCATIONS
SC.DET	SECURITY DOOR & DEVICE DETAIL
SC.DET2	SECURITY IP CAMERA DETAIL
SEC-RIS	STUDENT CENTER & THEATER SECURITY SYSTEM RISERS
TE0.00	DRAWING INDEX, ABBREVIATIONS, SYMBOLS & KEYS
TE0.01	COORDINATION ZONES
TE1.11	STAGE LEVEL PLAN
TE1.12	BALCONY LEVEL PLAN
TE1.13	BALCONY LEVEL RCP
TE1.21	CENTERLINE SECTIONS
	TRANSVERSE SECTIONS

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TE1.23	TRANSVERSE SECTIONS
TE1.24	TRANSVERSE SECTIONS
TE1.41	TYPICAL DETAILS AND SCHEDULES
TE1.42	TYPICAL DETAILS AND SCHEDULES
TL1.00	PERFORMANCE LIGHTING POSITIONS KEY
TL1.11	PERFORMANCE DIMMING AND CONTROL BOX SCHEDULE
TL1.21	PERFORMANCE DIMMING AND CONTROL SYSTEM OVERVIEW RISER
TL1.31	PERFORMANCE DIMMING AND CONTROL FACEPLATE DETAILS
TL1.32	PERFORMANCE DIMMING AND CONTROL FACEPLATE DETAILS
TS1.10	STAGE LEVEL PLAN & SEATING DETAILS
TS1.11	BALCONY LEVEL PLAN & SEATING DETAILS
TS1.12	LONGITUDINAL SECTION & SEATING DETAILS





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Advertisement No.: 19-02 Advertisement Date: August 10, 2018

#### INVITATION TO BID Connecticut Department of Administrative Services (DAS) Construction Services (CS) Office of Legal Affairs, Policy and Procurement 450 Columbus Blvd, Suite 1302, Hartford, CT 06103-1835 Go to the **DAS website** www.ct.gov/das Find Invitations to Bid on the State Click on "State Contracting Portal"; **Contracting Portal:** Select "Administrative Services, Construction Services"; Select the appropriate Invitation to Bid. Instructions for Follow the instructions in 6001 Construction On-line Bidding Instructions. **On-Line Bidding:** (http://portal.ct.gov/-/media/DAS/Construction-Services/DAS-CS-Library/6000-Series/6001-Construction-On-Line-Bidding-Instructions.pdf) For questions, call 860-713-5794. Date and Time of Time: 1:00 **PM** October 2018 **Bid Opening:** (Month) (Day) (Year) (ET) This Invitation to Bid is for the following Project: **Construction Costs:** Greater Than \$500,000 **Bidding Limited To:** Contractors Pregualified by DAS for General Building Construction (Group C) Threshold Limits: This Project DOES NOT exceed Threshold Limits. (C.G.S. §29-276b) **Project Title:** Master Plan Phase III Renovations and Additions Norwalk Community College **Project Location:** Norwalk Community College 188 Richards Avenue Norwalk, CT **Project Number:** BI-CTC-467 New construction and renovation of approximately 25,000 gross square feet distributed at **Project Description:** two campus buildings. West Campus new construction of a Student Center providing open seating area, food servery with associated food preparation areas and renovations. East Campus Theater new construction expansion and renovations. All project work shall be constructed of new materials. Building's structures are steel with Work Includes But Is Not masonry, metal and glass wall systems supported on cast in place concrete foundations Limited To The Following: enclosed with a membrane insulated roof assembly. Interior finishes include painted gypsum wallboard; floor coverings of tile, rubber, carpet and vinyl; ceilings of gypsum board and acoustical tile. **Date DAS Began Planning** 11-19-2012 Project: **Special Requirements:** N/A **Cost Estimate Range:** \$ 18,197,258. То 20,112,752. Date Plans & Specs Ready: August 15, 2018 Plans and Specs Download: Plans and Specs are available for electronic download on the DAS State Contracting Portal.



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Advertisement No.:	19-02	Advertisement Date:	August 10, 2018	

Invitation to Bid (continued)				
Contract Time Allowed:	Calendar	Days:	545	
Liquidated Damages:	\$ 3,394.0	00	Per Calenda	ar Day Beyond Substantial Completion.
	\$ 3094.0	00	Per Calenda	ar Day Beyond 90 days After Substantial Completion
Pre-Bid Meeting Date:	8/29/2018			
	$\boxtimes$	Bidder	s are <b>strong</b>	ly encouraged to attend the Pre-Bid Meeting.
		Bidder	s are <i>require</i>	ed to attend a MANDATORY Pre-Bid Meeting.
Pre-Bid Meeting Time:	11:00	⊠ AM	□ PN	1
Pre-Bid Meeting Location:	Norwalk ( Pepsico T		nity College,1	188 Richards Avenue, Norwalk, CT, East Campus
Pre-Bid Meeting Contact:	DAS/CS F	Project	Manager:	Lisa Humble
		PI	hone No.:	860.713.5823
Subcontractor and/or Supplier Small Business Enterprise (SBE) & Minority Business Enterprise (MBE) Set-Aside Requirements:	See 00 41 00 Bid Proposal Form			
Bid Proposal Submission and Other Bid Submittal Requirements:	See Sections 00 21 13 Instructions to Bidders, 00 41 00 Bid Proposal Form, and 00 41 10 Bid Package Submittal Requirements for Bid Proposal submission requirements, including requirements for Affidavits, Certifications, Addenda, Pre-Bid Equals and Substitution Requests, and other bidding documents.			
Bid Upload and Bid Opening:	Bids can be uploaded and edited electronically in BizNet <b>UNTIL 1:00 p.m.</b> on the <b>Bid Opening Date</b> and thereafter shall be locked down and publicly opened in the State Contracting Portal.			
Bid Results:			tely two (2) d State Contrac	lays after the Bid Opening Date, the Bid Results will cting Portal.
Guide to the Code of Ethics For Current or Potential State Contractors (for contracts greater than \$500,000):	, , , , , , , , , , , , , , , , , , , ,			
Prevailing Wage Rates:	Prevailing wages are required on this project, in accordance with the schedule provided in the bid documents, pursuant to Connecticut General Statutes Section 31-53 (a) through (h), as amended.			
	Each contractor who is awarded a contract on or after October 1, 2002 shall be subject to provisions of the Connecticut General Statutes, Section 31-55a concerning annual adjustments to prevailing wages.			
	Wage Rates will be posted each July 1st on the Department of Labor website <a href="www.ctdol.state.ct.us">www.ctdol.state.ct.us</a> . Such prevailing wage adjustment shall not be considered a matter for any contract amendment.			
To access Executive Orders:	Go to www.ct.gov > Governor Dannel P. Malloy > Press Room > Executive Orders.			



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Advertisement No.: 19-02 Advertisement Date: August 10, 2018

### **Invitation to Bid** (continued)

## Important Notices:

#### **UPDATED DOCUMENTS:**

Many **Division 00** and **Division 01** documents have been updated. Read all of the contents of the Project Manual carefully!

All Contractors are cautioned that any modifications or alterations made to either the Project Manual or any of the forms and documents contained herein may be just cause to *reject the bid!* 

#### **NEW PROCESS FOR CONSTRUCTION STORMWATER GENERAL PERMIT:**

See Section 01 50 00 Temporary Facilities and Controls.

For all DAS/CS construction projects disturbing **one or more total acres of land area** on a site regardless of project phasing, the **Architect/Engineer** shall be responsible for filing a Department of Energy and Environmental Protection (DEEP) *General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (DEEP-WPED-GP-015)* registration and Stormwater Pollution Control Plan (SPCP) through the online DEEP ezFile Portal **prior** to bidding.

Once the **Contractor** is under contract with DAS/CS, and *prior* to the commencement of any construction activities, the Contractor (and all other contractors and subcontractors listed on the SPCP) shall assume responsibility for storm water pollution control and conform to the general permit obligations and requirements by **signing** the SPCP "Contractor Certification Statement" and License Transfer Form as directed by the Architect/Engineer.

At completion of the project, the Contractor shall file a Notice of Termination (DEP-PED-NOT-015) with the DEEP in order to terminate the Construction Stormwater General Permit. A project shall *only* be considered complete after all **post-construction** measures are installed, cleaned, and functioning and the site has been stabilized for at least **three (3) months** following the cessation of construction activities.

**IMPORTANT NOTE:** The Commissioner of the CT Department of Administrative Services reserves the right to do any of the following without liability, including but not limited to: (a) waive technical defects in the bid proposal as he or she deems best for the interest of the State; (b) negotiate with a contractor in accordance with Connecticut General Statutes Section 4b-91;(c) reject any or all bids; (d) cancel the award or execution of any contract prior to the issuance of the "Notice To Proceed;" and, (e) advertise for new bids.

All Project Questions, Bid Questions, and Pre-Bid Equals and Substitution Requests must be submitted fourteen (14) Calendar Days prior to the Bid Due Date.

All **Project Questions** and Pre-Bid **Equals and Substitution Requests** must be emailed (not phoned) to the **Architect/Engineer** with a **copy** to the **Construction Administrator** and **the DAS/CS Project Manager** listed below.

Architect/Engineer with a copy to the Construction Administrator and the DAS/CS Project Manager listed below.					
Architect/Engineer:	Mitchell/Giurgola Architects	Email:	doherty@mitchellgiurgola.com		
Construction Administrator:	The Whiting Turner Contracting Company Email: chris.haley@v		chris.haley@whiting-turner.com		
DAS/CS Project Manager:	Lisa Humble	Email:	lisa.humble@ct.gov		
All Bid Questions must be emailed to the DAS/CS Associate Fiscal Administrative Officer listed below.					
DAS/CS Associate Fiscal Administrative Officer:	Mellanee Walton	Email:	mellanee.walton@ct.gov		

#### Instructions to Bidders

DAS ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

#### 1.0 General Bid Proposal Information

#### 1.1 On-Line Bidding:

- 1.1.1 The Department of Administrative Services (DAS) Construction Services (CS) has streamlined the Bid process by allowing contractors to submit their Bid Package Documents on line through the State Contracting Portal and BizNet. Rather than submitting paper Bid Package Documents, contractors simply respond to an Invitation to Bid on the State Contracting Portal by retrieving and uploading their documents electronically through their BizNet account. Once completed, the Bid Proposal must be electronically signed prior to the date and time of the Bid Opening. See Page 1 of the Invitation to Bid for the Date and Time of the Bid Opening.
- 1.1.2 All Bidders shall electronically upload their Bid Package Documents to BizNet following the instructions in the DAS/CS publication, 6001 Construction On-line Bidding Instructions, available for download here: Go to the DAS Homepage (www.ct.gov/DAS), Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 6000 Series > 6001 Construction On Line Bidding Instructions. For questions, call 860-713-5794 or 860-713-5783.

#### 1.2 Bid Opening:

All Bids shall be publicly opened in BizNet by the awarding authority as stated in Section 00 11 16 Invitation to Bid.

#### 1.3 Withdrawal of Bid:

Any **Bid** once uploaded into BizNet cannot be deleted. A Bid may only be **withdrawn** by uploading a written **Letter of Withdrawal** to BizNet using the "**Other Solicitation Document**" link **prior** to the date and time of the Bid Opening.

#### 1.4 Disqualification from Bidding:

Any contractor who violates any provision of **Connecticut General Statutes (C.G.S.) § 4b-95**, as revised, shall be **disqualified** from bidding on other contracts for a period not to exceed **twenty-four (24) months**, commencing from the date on which the violation is discovered, for each violation.

#### 1.5 Waive Minor Irregularities:

- 1.5.1 The awarding authority **shall** be authorized to **waive minor irregularities** which he or she considers in the best interest of the State, provided the reasons for any such waiver are stated in writing by the awarding authority and made a part of the contract file.
- **1.5.2** No such bid shall be rejected because of the failure to submit prices for, or information relating to, any item or items for which no specific space is provided in the bid form furnished by the awarding authority, but this sentence shall not be applicable to any failure to furnish prices or information required by **C.G.S. § 4b-95**, as revised, to be furnished in the bid form provided by the awarding authority.

#### 1.6 Minimum Percentage of Work:

The awarding authority *may* require in the **Bid Proposal Form** that the contractor agree to perform a stated, minimum percentage of work with its **own forces**, in accordance with **C.G.S.** § **4b-95(b)**.

#### 1.7 Set-Aside Contracts:

The awarding authority *may* also require the contractor to set aside a portion of the contract for subcontractors who are eligible for **set-aside contracts**.

#### 1.8 Connecticut Sales And Use Taxes:

- 1.8.1 All Bidders shall familiarize themselves with the current statutes and regulations of the Connecticut Department of Revenue Services (DRS), including the Regulations of Connecticut State Agencies (R.C.S.A.) §12-426-18 and all relevant state statutes. The tax on materials or supplies exempted by such statutes and regulations shall not be included as part of a bid; see the Contractor's Exempt Purchase Certificate (CERT-134), available for download from the DRS website (www.ct.gov/drs).
- 1.8.2 The State of Connecticut construction contract has the following tax exemptions: (1) Purchasing of materials which will be physically incorporated and become a permanent part of the project; and (2) Services that are resold by the contractor. For example, if a General Contractor hires a plumber, carpenter or electrician, a resale certificate may be issued to the subcontractor because these services are considered to be integral and inseparable component parts of the building contract.
- **1.8.3** The following items are <u>not</u> exempt from taxes when used to fulfill a State of Connecticut construction contract: Tools, supplies and equipment used in fulfilling the construction contract.

#### 1.9 Union Labor:

Attention is called to the fact that there may or could be construction work carried on at the site by union labor. This fact must be kept in mind by all Bidders.

#### 1.10 Rejection of Bids:

The awarding authority shall reject every such Bid Proposal, including but not limited to, the following reasons:

- **1.10.1** A **Bid Proposal Form** that does *not* contain the signature of the bidder or its authorized representative.
- 1.10.2 A Bid Proposal Form that is *not* accompanied by the following documents in BizNet:
  - .1 Section 00 43 16 Standard Bid Bond, completed for either the Bid Bond option or Certified Check option;
  - .2 A Certified Check (if applicable) delivered to the DAS/CS Office of Legal Affairs, Policy, and Procurement prior to the date and time of the Bid Opening;
  - .3 Section 00 45 14 General Contractor Bidder's Qualification Statement
  - .4 A DAS Contractor Pregualification Certificate for the Bidder for Projects greater than \$500,000;
  - .5 A DAS Update (Bid) Statement for the Bidder for Projects greater than \$500,000;
  - .6 A Gift and Campaign Contribution Certification Office of Policy and Management (OPM) Ethics Form 1;
  - .7 A Consulting Agreement Affidavit OPM Ethics Form 5. NOTE: If the Bidder fails to submit or upload the Consulting Agreement Affidavit required under C.G.S. § 4a-81, such bidder shall be disqualified and the award shall be made to the next lowest responsible qualified bidder or new bids or proposals shall be sought;
  - .8 An Ethics Affidavit (Regarding State Ethics) OPM Ethics Form 6;
  - .9 An Iran Certification OPM Ethics Form 7.
- **1.10.3** A **Bid Proposal Form** that:
  - .1 Fails to acknowledge all Addenda in the space provided in the Bid Proposal Form;
  - .2 Fails to correctly list the Named Subcontractors on the Bid Proposal Form;
  - .3 Fails to correctly state a Named Subcontractor's price on the Bid Proposal Form; and
  - .4 Fails to list Named Subcontractors who are DAS Prequalified at the time of the bid.
- 1.10.4 A Bid Proposal Form that is not submitted on the forms furnished for the specific project. NOTE: In no event will bids or changes in bids be made by telephone, telegraph, facsimile or other communication technology except through BizNet. All pages of the Bid Proposal Form must be uploaded to BizNet prior to the date and time of the Bid Opening.
- **1.10.5** A **Bid Proposal Form** that has omitted items, omitted pages, added items not called for, altered the form, contains conditional bids, contains alternative bids, or contains obscure bids.
- **1.10.6** A *paper* **Bid Package** sent to the DAS/CS Office of Legal Affairs, Policy, and Procurement. Such bids will be returned to the bidder unopened.
- **1.10.7** Any Bidder that does *not* make all required pre-award submittals *within* the designated time period. DAS/CS *may* reject such bids as non-responsive.

#### 1.11 Pre-Bid Meeting:

- 1.11.1 See Section 00 11 16 Invitation to Bid and Section 00 25 13 Pre-Bid Meeting Agenda for details.
- **1.11.2** When a **Pre-Bid Meeting** is "**strongly encouraged**", all attendees shall sign his or her name to the official roster and list the name and address of the company he or she represents.
- 1.11.3 When a Pre-Bid Meeting is MANDATORY, all attendees will be required to register. Proper registration means that the attendee has signed his or her name to the official roster and listed the name and address of the company he or she represents on the official roster no later than the designated start time of the MANDATORY Pre-Bid Meeting. Bidders are advised to register early as no attendee will be allowed to register after the advertised start time of the MANDATORY Pre-Bid Meeting.

All bids submitted by all contractors who have *not* properly registered and attended the **MANDATORY Pre-Bid Meeting** shall be rejected as non-responsive.

1.11.4 All Bidders Attending a Pre-Bid Meeting at a Connecticut Department of Corrections (DOC) Facility: Prior to the Pre-Bid Meeting, download the "Security Background Questionnaire" from the CT DOC website (www.ct.gov/doc under "Forms"), complete and submit the form as directed, and obtain approval, otherwise admission to the Pre-Bid Meeting will be denied. It is recommended that the approved form be brought as evidence of approval to attend the Pre-Bid Meeting.

#### 1.12 Pre-Bid Equals and Substitution Requests Procedures:

- 1.12.1 All submissions requesting "Equals and/or Substitutions" shall be made by the Bidder in accordance with Section 01 25 00 Substitution Procedures of the Division 01 General Requirements and Article 15, Materials: Standards of Section 00 72 13 General Conditions. Every submission shall contain all the information necessary for DAS/CS to evaluate the submission and the request. Failure to submit sufficient information to make a proper evaluation, including submittal of data for the first manufacturer listed as well as the data for the "Equals and/or Substitutions" proposed, shall result in a rejection of the submission and request. Upon receipt of the submission and request, DAS/CS shall notify the Bidder that the request has been received and as soon as possible shall render a decision on such submission and request.
- 1.12.2 Pre-Bid-Opening Substitution of Materials and Equipment: The Owner will consider requests for equals or substitutions if received fourteen (14) Calendar Days prior to the Bid Opening Due Date, as stated in the Invitation To Bid. The Equal or Substitute Product Request (Form 7001) must be used to submit requests. Download Form 7001 from the DAS Homepage (www.ct.gov/DAS) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 7000 Series.
- 1.12.3 Equals and/or Substitutions Requests Submittal: Requests for Equals or Substitutions shall be submitted to the DAS/CS Project Manager, Architect / Engineer, and Construction Administrator.
- **1.12.4 Substitution Request Deadline:** Any substitution request not complying with requirements will be denied. Substitution requests sent **after** the **Deadline** will be denied.
- **1.12.5** Addendum: An Addendum shall be issued to inform all prospective bidder of any accepted substitution in accordance with our addenda procedures.
- **1.12.6 Time Extensions:** No extensions of time will be allowed for the time period required for consideration of any Substitution or Equal.
- 1.12.7 Post Contract Award Substitution of Materials and Equipment: All requests for "Equals and Substitutions" after the Award of the Contract shall be made only by the Prime Contractor for materials or systems specified that are no longer available. The requests will not be considered if the product was not purchased in a reasonable time after award, in accordance with Article 15, Materials: Standards of Section 00 72 13 General Conditions.

#### 1.13 Joint Ventures:

- 1.13.1 Each entity in a Joint Venture shall submit with the Venture's bid a letter on their respective company letterheads stating:
  - Their agreement to bid as a Joint Venture with the other named Joint Venture, and set forth the name and address
    of the other Joint Venture(s).
  - · The respective percentage of the project work that would be the responsibility of each of the Joint Ventures.
- 1.13.2 Prequalification: Each entity in a Joint Venture shall submit its Prequalification Certificate and Update (Bid) Statement. Each entity in a Joint Venture shall be prequalified at the time of the bid and during the entire project construction. Each entity in a Joint Venture shall have the prequalification single project limit, and remaining aggregate capacity balance to meet the value of its respective percentage of the joint proposed bid.
- 1.13.3 Each entity in a Joint Venture shall submit Section 00 45 14 General Contractor Bidder's Qualification Statement.
- 1.13.4 Bonding: The Joint Venture shall obtain the required bonding from a surety for the total amount of the contract price.
- **1.13.5 Insurance: Each entity** in a Joint Venture shall have the **required insurance coverages and limits** to meet the insurance requirements of the contract. The Joint Venture shall provide **Builder's Risk insurance**.
- 1.13.6 Bid Submission and Contract Signing: If a Joint Venture submits a bid proposal, it shall be considered to be a proposal by each of the Joint Ventures, jointly and severally, for the performance of the entire contract as a Joint Venture in accordance with the terms and conditions of the contract. Each entity in a Joint Venture is required to sign the contract acknowledging that each Joint Venture shall be jointly and severally liable for the performance of the entire contract.
- 1.13.7 Certificate of Legal Existence: Each entity in a Joint Venture shall obtain a Certificate of Legal Existence and submit it with the contract documents.

#### 1.14 Procedure for Alleged Violation(s) of Part II Chapter 60 of C.G.S. Bidding and Contracts:

- 1.14.1 The Regulations of Connecticut State Agencies establishes a procedure for promptly hearing and ruling on claims alleging a violation or violations of the contract bidding provisions of Part II of Chapter 60 of the Connecticut General Statutes (hereinafter "Chapter 60"). In view of the fact that time is normally of the essence in awarding construction contracts under Chapter 60, the grievance procedures are intended to be quick, informal and conclusive so as to avoid delays which can increase costs and jeopardize the very ability of the State to proceed with needed public works projects.
- 1.14.2 Download "6510 Procedure for Alleged Violation(s)" and "6505 Petition for Alleged Violation(s)" from the DAS Homepage (<a href="www.ct.gov/DAS">www.ct.gov/DAS</a>) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 6000 Series > Scroll down to locate documents.

#### 1.15 Labor Market Area:

- 1.15.1 All Bidders shall have read C.G.S. §§ 31-52 and 31-52a, as revised. These sections relate to the preference of State citizens and the preference of residents of the labor market area in which the work under the contract is to be done and the penalties for violations thereof.
- 1.15.2 In order to avoid violations by the contractor and to cooperate with and assist the State in the implementation of the statutory mandates, any bidder awarded a contract with the State shall be required to provide the State with the following information:
  - .1 The names and addresses of employees utilized by the contractor and by its subcontractors and how long each such employee has resided in Connecticut.
  - .2 How long each employee has resided in the labor market area, as established by the State Labor Commissioner, in which the work under the contract is to be done. Labor market areas are indicated on the end of this section.
  - .3 Within thirty (30) days after the start of work, the contractor shall submit a signed statement setting forth the procedures the contractor and its subcontractors have taken to assure that they have sought out qualified residents of the labor market area. Also, the statement shall include information as to how many persons were considered for employment and how many were actually hired. Such procedures will include, but not be limited to, obtaining names of available persons from area Employment Security Offices.
  - .4 In the same manner as **Subsection 3.9.2.3** above, the statement **shall** indicate the steps taken to assure that the contractor and its subcontractors have sought out qualified residents of this State.
- **1.15.3** The contractor **shall** cooperate with and provide information to the DAS/CS Project Manager or their designee assigned to collect and verify the information required. The State may request that all such information be updated during the term of the contract at reasonable times.
- **1.15.4** All such information gathered and compiled by the State **shall** be forwarded to the Labor Commissioner.

#### 1.15.5 Pursuant to C.G.S. § 31-52b, as revised:

"The provisions of C.G.S. § 31-52 and 31-52a **shall not** apply where the State or any subdivision thereof may suffer the loss of revenue granted or to be granted from any agency or department of the federal government as a result of said sections or regulative procedures pursuant thereto."

However, no exception shall be determined to be applicable unless stated in writing by the Commissioner of the Department of Administrative Services.

**1.15.6 Website Link:** For guidance on the CT DOL Labor Market Areas (LMA) go to the CT DOL website <a href="http://www.ctdol.state.ct.us/">http://www.ctdol.state.ct.us/</a>, under "Program Services", click on "Labor Market information".

#### 1.16 Executive Orders:

- 1.16.1 All Executive Orders of which are incorporated into and are made a part of the Contract as if they had been fully set forth in it. The Contract is subject to the provisions of the following:
  - .1 Executive Order No. 3: Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices;
  - **.2 Executive Order No. 17:** Governor Thomas J. Meskill promulgated February 15, 1973, concerning the listing of employment openings;
  - .3 Executive Order No. 16: Governor John G. Rowland promulgated August 4, 1999, concerning violence in the workplace;
  - **.4 Executive Order No. 14:** Governor M. Jodi Rell, promulgated April 17, 2006, concerning procurement of cleaning products and services; and
  - .5 Executive Order No. 49: Governor Dannel P. Malloy, promulgated May 22, 2015, concerning the requirement for certain state contractors to disclosure campaign contributions to candidates for statewide public office or The General Assembly and to ensure convenient public access to information related to gifts and campaign contribution disclosure affidavits by state contractors.
- **1.16.2** All Executive Orders are available for download from the State of Connecticut website. Go to <a href="www.ct.gov">www.ct.gov</a>, click on "Governor Dannel P. Malloy", click on "Press Room", and click on "Executive Orders".

#### 1.17 Retaliation For Disclosure of Information:

- 1.17.1 Each contract between a state or quasi-public agency and a large state contractor shall provide that, if an officer, employee, or appointing authority of a large state contractor takes or threatens to take any personnel action against any employee of the contractor in retaliation for such employee's disclosure of information to the Auditors of Public Accounts or the Attorney General under the provisions of C.G.S. § 4-61dd (a), the contractor shall be liable for a civil penalty of not more than five thousand dollars for each offense, up to a maximum of twenty per cent of the value of the contract. Each violation shall be a separate and distinct offense and in the case of a continuing violation each calendar day's continuance of the violation shall be deemed to be a separate and distinct offense. The executive head of the state or quasi-public agency may request the Attorney General to bring a civil action in the Superior Court for the judicial district of Hartford to seek imposition and recovery of such civil penalty.
- **1.17.2** Each large state contractor shall post a **notice** of the provisions of **C.G.S. § 4-61dd** relating to large state contractors in a conspicuous place that is readily available for viewing by the employees of the contractor.

#### 1.18 Laws of the State of Connecticut:

Forum and Choice of Law. The Bidder agrees that in the event it is awarded a Contract, the Bidder and the State deem the Contract to have been made in the City of Hartford, State of Connecticut. Both parties agree that it is fair and reasonable for the validity and construction of the Contract to be, and it shall be, governed by the laws and court decisions of the State of Connecticut, without giving effect to its principles of conflicts of laws. To the extent that any immunities provided by Federal law or the laws of the State of Connecticut do not bar an action against the State, and to the extent that these courts are courts of competent jurisdiction, for the purpose of venue, the complaint shall be made returnable to the Judicial District of Hartford only or shall be brought in the United States District Court for the District of Connecticut only, and shall not be transferred to any other court, provided, however, that nothing here constitutes a waiver or compromise of the sovereign immunity of the State of Connecticut. The Bidder waives any objection which it may now have or will have to the laying of venue of any claims in any forum and further irrevocably submits to such jurisdiction in any suit, action or proceeding.

#### 1.19 State's Sovereign Immunity:

Nothing in this Agreement shall be construed as a waiver or limitation upon the **State's sovereign immunity**. To the extent this Section is found to be inconsistent with any other part of this Agreement, this Section shall control. This Section of the Agreement shall survive the completion and/or termination of this Agreement.

#### 2.0 Bid Proposal Form Instructions:

#### 2.1 Bid Proposal Form:

**2.1.1** All Bidders shall upload ALL pages of Section 00 41 00 Bid Proposal Form to BizNet, prior to the date and time of the Bid Opening.

#### 2.2 Threshold Projects:

- 2.2.1 See page 1 of the Bid Proposal Form to determine if this Project exceeds the Threshold Limits.
- 2.2.2 If this Project exceeds Threshold Limits, *all* Bidders shall list their Firm's Major Contractor Registration License Number in the Bid Proposal Form.
- 2.2.3 The Apparent Low Bidder shall also provide the Subcontractor(s) Major Contractor Registration License number(s) to the DAS/CS Office of Legal Affairs, Policy, and Procurement within ten (10) business days <u>after</u> receipt of the Letter of Intent from DAS/CS.
- 2.2.4 Summary of Registration Requirements for Major Contractors: Any person engaged in the business of construction, structural repair, structural alteration, dismantling or demolition of a structure or addition that exceeds the threshold limits provided in C.G.S §29-276b, or any person who, under the direction of a general contractor, performs or offers to perform any work that impacts upon the structural integrity of a structure or addition, including repair, alteration, dismantling or demolition of a structure or addition that exceeds the threshold limits shall engage in or offer to perform the work of a Major Contractor unless such person has first obtained a license or certificate of registration from the Connecticut Department of Consumer Protection (DCP). Individuals must be licensed under the requirements of C.G.S §20-341gg "Registration of Major Contractors". DCP shall issue a certificate of registration to any person who is prequalified pursuant to section 4a-100 who applies for registration in accordance with this section.
- 2.2.5 The Bidder and all Subcontractors that engage in work that impacts upon the structural integrity of a structure or addition must register as a Major Contractor with DCP and obtain a Major Contractor License issued by DCP PRIOR to the date and time of the Bid Opening for this Project.
- 2.2.6 For further information go to the DCP Website: http://www.ct.gov/dcp

#### 2.3 Proposed Lump Sum Base Bid, Allowances, and Contingent Work:

- 2.3.1 The proposed Lump Sum Base Bid shall be set forth in the space provided on Section 00 41 00 Bid Proposal Form.
- 2.3.2 The Proposed Lump Sum Base Bid shall include all Allowances, all work indicated on the drawings and/or described in the specifications except for Contingent Work. See the Bid Proposal Form, Section 01 20 00 Contract Considerations, and Section 01 23 13 Supplemental Bids of Division 01 General Requirements for details regarding Contingent Work.
- 2.3.3 "Contingent Work" includes Unit Prices (for Earth and Rock Excavation, Environmental Remediation, and/or Hazardous Building Materials Abatement) and Supplemental Bids. See Section 01 20 00 Contract Considerations and Section 01 23 13 Supplemental Bids, respectively, for applicability.
- 2.3.4 The Proposed Lump Sum Base Bid shall be shown in *both* numerical figures and "printed" words dollar amount. In the event of any discrepancy the "printed" words dollar amount shall govern.

#### 2.4 Addenda and Interpretations:

- **2.4.1** The **Number of Addenda** issued by the State of Connecticut shall be set forth in the space provided on the **Bid Proposal Form**. It shall be the Bidder's responsibility to make inquiry as to, and to obtain, the Addenda issued, if any.
- **2.4.2** Addenda, if issued, will be posted on the State Contracting Portal.
- 2.4.3 Failure to acknowledge all Addenda in the space provided in the Bid Proposal Form shall be cause for rejection of the bid.
- 2.4.4 Attaching Addenda to the Bid Proposal Form does not constitute an acknowledgement of all Addenda and does not relieve the Bidder from the requirement for the Bidder to acknowledge all Addenda in the space provided on the Bid Proposal Form.
- 2.4.5 No interpretations of the meaning of the plans, specifications or other contract documents will be made orally at any time. Every request for such interpretation shall be in writing to the awarding authority and to be given consideration shall be received at least fourteen (14) Calendar Days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written Addenda to the specifications which, if issued, will be posted on the State Contracting Portal.
- **2.4.6** Contractors who have subscribed through BizNet to receive daily e-mail alert notices when new Bids/RFPs are issued will be notified via a daily CT DAS "Connecticut Procurement Portal Daily Notice".

#### 2.5 Bidder's Qualification Statement and Objective Criteria for Evaluating Bidders:

- 2.5.1 All Bidders shall download, complete, and upload Section 00 45 14 General Contractor Bidder's Qualification Statement to BizNet prior to the date and time of the Bid Opening. See BizNet for a template. This information shall be considered as part of the Bid Proposal Form. Failure of a Bidder to answer any question or provide required information may be grounds for the awarding authority to disqualify and reject the bid.
- 2.5.2 All Bidders shall comply with Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders. The Objective Criteria Established for Evaluating Qualifications of Bidders are to assure that the State of Connecticut will secure the "lowest responsible and qualified bidder" who has the ability and capacity to successfully complete the Bid Proposal Form and the Work. Failure to comply with any portion of this requirement may cause rejection of the bid. Note: Individual Specification Sections may contain General Contractor and/or Subcontractor Qualification requirements that exceed those in Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders.

#### 2.6 Bidder's Pregualification Requirements for Projects exceeding \$500,000:

- 2.6.1 All Bidders for Projects with estimated Construction Costs greater than \$500,000 shall upload a current copy of their "DAS Prequalification Certificate" and "DAS Update (Bid) Statement" for the applicable Class of Work on page 1 of Section 00 11 16 Invitation to Bid to Biznet prior to the date and time of the Bid Opening.
- 2.6.2 Pursuant to C.G.S § 4b-91(a)(2) and C.G.S. §4a-100, as revised, every contract for the construction, reconstruction, alteration, remodeling, repair or demolition of any public building or any other public work by the state that is estimated to exceed five hundred thousand dollars (\$500,000) shall be awarded only to the lowest responsible and qualified Bidder who is "prequalified" by DAS in the Class of Work for this Project, as specified in Section 00 11 16 Invitation to Bid. No person who's Contract or Subcontract exceeds \$500,000 in value may perform work as a Contractor or Subcontractor, unless the person is prequalified, at the time of bid submission, in accordance with C.G.S. § 4a-100, as amended, C.G.S. § 4b-91(a)(2), and C.G.S. §4b-91 (j). "Prequalified" includes the contractor's or substantial subcontractor's prequalification classifications, aggregate work capacity ratings and single project limits.
- 2.6.3 Failure to upload either the "DAS Prequalification Certificate" or "DAS Update (Bid) Statement" to Biznet prior to the date and time of the Bid Opening shall cause rejection of the bid and shall not be considered a minor irregularity under C.G.S. § 4b-95.
- 2.6.4 See Section 00 40 15 CT DAS Prequalification Forms for instructions on preparing and/or downloading your Firm's "DAS Contractor Prequalification Certificate" and "DAS Update (Bid) Statement".
- 2.6.5 Bidder's Certification: Within ten (10) business days after receipt of the Letter of Intent from DAS/CS, the Apparent Low Bidder shall submit a Bidder's Certification certifying that the information in the bid is true, that there has been no substantial change in the Bidder's financial position or corporate structure since its most recent DAS Prequalification Certificate and DAS Update (Bid) Statement and that the bid was made without fraud or collusion with any person. See Section 00 92 10 Additional Forms of this Project Manual for a sample form.

### 2.7 Named Subcontractor Requirements:

- 2.7.1 All Bid Proposals shall be for the complete work as specified and shall include the names of any Subcontractors for the four (4) Classes of Work specified in C.G.S. § 4b-93(a), as revised, and for each other class of work for which the awarding authority has required a separate section pursuant to said subsection, together with the dollar amounts of their subcontracts. The contractor shall be selected on the basis of such bids.
- 2.7.2 The Named Subcontractor Bid Price shall be the price set forth in the space provided on the Bid Proposal Form.
- 2.7.3 No bid shall be rejected because of an error in setting forth the Name of a Subcontractor as long as the Subcontractor or Subcontractors designated are clearly identifiable.
- 2.7.4 No bid shall be rejected because the **Named Subcontractor's** plans and specifications do not accompany the bid or are not submitted with the bid.
- **2.7.5** Failure to correctly state a **Named Subcontractor's price** on the Bid Proposal Form **shall** be cause for **rejection** of the Bid.
- 2.7.6 Named Subcontractor Replacement: The awarding authority may require the Bidder to replace a Named Subcontractor whenever the awarding authority determines in their sole discretion that such replacement is in the best interest of the State.

#### 2.7.7 Named Subcontractor Substitution:

- .1 The awarding authority **shall not** permit **substitution** of a subcontractor for one **Named** in accordance with the provisions of **C.G.S.** § **4b-95**, as revised, **except** for "**Good Cause**".
- .2 The awarding authority shall not permit substitution of a subcontractor for any designated sub-trade work bid to be performed by the Bidder's own forces in accordance with the provisions of C.G.S. § 4b-95 except for "Good Cause".
- .3 "Good Cause": The term "good cause" includes but is not limited to, a subcontractor's or, where appropriate, a Bidder's: (1) death or physical disability, if the listed subcontractor is an individual; (2) dissolution, if a corporation or partnership; (3) bankruptcy; (4) inability to furnish any performance and payment bond shown on the bid form; (5) inability to obtain, or loss of, a license necessary for the performance of the particular category of work; (6) failure or inability to comply with a requirement of law applicable to contractors, subcontractors, or construction, alteration, or repair projects; and (7) failure to perform its agreement to execute a subcontract under C.G.S. § 4b-96, as revised.

#### 2.7.8 Named Subcontractor DAS Prequalification Requirement for Subcontracts exceeding \$500,000:

- .1 The Three (3) Apparent Lowest Bidders shall receive VIA EMAIL a "Set-Aside Contractor Schedule Request" ("Request") from the DAS/CS Office of Legal Affairs, Policy, and Procurement. For Subcontracts greater than \$500,000, the Three (3) Apparent Lowest Bidders shall submit within ten (10) Calendar Days after receipt of the Request current DAS Prequalification Certificate(s) and Update (Bid) Statement(s) for each Named Subcontractor in Table 2.7 of the Bid Proposal Form, to the extent the Class of Work for the Named Subcontractor is a Prequalification Classification. This information shall be considered as part of the Bid Proposal Form and failure to comply with any portion of this requirement may cause rejection of the bid.
- .2 Instructions for downloading "DAS Contractor Prequalification Certificates" and "DAS Update (Bid) Statement" can be found in Section 00 40 15 CT DAS Prequalification Forms.
- .3 In accordance C.G.S. §4b-91 (j), no person whose subcontract exceeds five hundred thousand dollars in value may perform work as a subcontractor on a project, which project is estimated to cost more than five hundred thousand dollars and is paid for, in whole or in part, with state funds, unless, at the time of bid submission, the person is prequalified in accordance with C.G.S. §4a-100, as amended. "Prequalified" includes the contractor's or substantial subcontractor's prequalification classifications, aggregate work capacity ratings and single project limits. For Subcontracts estimated to exceed \$500,000, the Named Subcontractor must be "prequalified" by DAS in the Class of Work specified in Table 2.7 of Section 00 41 00 Bid Proposal Form at the time of bid submission, pursuant to C.G.S. §4b-91(j) and C.G.S. § 4a-100, as amended. This requirement also applies to the Bidder, if the Bidder is a Named Subcontractor.

#### 2.7.9 Named Subcontractor Bidder's Qualification Statements (Section 00 45 17)

- .1 The Three (3) Apparent Lowest Bidders shall receive VIA EMAIL a "Set-Aside Contractor Schedule Request" ("Request") from the DAS/CS Office of Legal Affairs, Policy, and Procurement. For Projects with estimated Construction Costs greater than \$500,000, the Three (3) Apparent Lowest Bidders shall submit within ten (10) Calendar Days after receipt of the Request completed Section 00 45 17 Named Subcontractor Bidder's Qualification Statement(s) of this Project Manual for each Named Subcontractor in Table 2.7 of the Bid Proposal Form. This information shall be considered as part of the Bid Proposal Form and failure to comply with any portion of this requirement may cause rejection of the bid.
- .2 Important Note: Individual Technical Specification Sections <u>may</u> contain qualification requirements that **exceed** those from **Section 00 45 17 Named Subcontractor Bidder's Qualification Statement.**

#### 2.7 Named Subcontractor Requirements (continued):

#### 2.7.10 Bidder Performing Work as Named Subcontractor:

- .1 In accordance with C.G.S. § 4b-95(c), it shall be presumed that the **Bidder** intends to perform, with its own employees, all work in such four (4) Classes of Work and such other classes, for which *no* Subcontractor is named in **Table 2.7** of the **Bid Proposal Form.** In accordance with C.G.S. § 4b-92, as revised, the **Bidder's** qualifications for performing such work shall be subject to review.
- .2 If the Bidder has listed itself as a Named Subcontractor(s) for a Class(es) of Work in Table 2.7 of the Bid Proposal Form and the proposed dollar value of the Subcontract(s) is greater than \$500,000, then to the extent the Class(es) of Work is a Prequalification Classification, the Bidder shall provide a current DAS Prequalification Certificate and Update (Bid) Statement for each of the applicable Class(es) of Work within ten (10) Calendar Days after receipt of the "Set-Aside Contractor Schedule Request" from DAS/CS.

#### 2.8 Set-Aside Requirements:

- 2.8.1 Bidder's DAS Set-Aside Certificate: All Small Business Enterprise (SBE) / Minority Business Enterprise (MBE) Bidders shall upload a copy of their Firm's current "DAS Set-Aside Certificate" to BizNet prior to the date and time of the Bid Opening.
- 2.8.2 Bidder Contract Compliance Monitoring Report For Projects With Construction Costs Estimated To Be Less Than \$500,000: All Firm's shall upload a completed copy of the CHRO Employment Information Form, "Bidder Contract Compliance Monitoring Report" with their Bid Proposal Form prior to the date and time of the Bid Opening. The report is posted on the CHRO Webpage (http://www.ct.gov/chro/cwp/view.asp?a=2525&Q=315900&chroPNavCtr=|#45679).
- 2.8.3 All Bidders shall be required to award not less than the percentage(s) stated on page 1 of Section 00 41 00 Bid Proposal Form to Subcontractors who are currently certified and eligible to participate under the State of Connecticut Set-Aside Program for SBE and/or MBE contractors, in accordance with C.G.S.§ 4a-60g. Failure to meet these requirements shall cause rejection of the bid. The MBE participation does count as part of the SBE participation.
- 2.8.4 Set-Aside Contractor Schedule Request: The SBE/MBE participation requirement *must be met* even if the Bidder is certified and eligible to participate in the Small Business Set-Aside Program. To facilitate compliance with this requirement for set-aside subcontractors, the Three (3) Apparent Lowest Bidders shall receive VIA EMAIL a "Set-Aside Contractor Schedule Request" ("Request") from the DAS/CS Office of Legal Affairs, Policy, and Procurement. As directed in the Request, the Three (3) Apparent Lowest Bidders shall submit within ten (10) Calendar Days after receipt of the Request, a list of certified set-aside contractors to be used on this project along with the dollar amounts to be paid to each. (See Section 00 73 27 Set-Aside Contractor Schedule for a sample Request.)

A copy of the current DAS Set-Aside Certificate for each Subcontracted SBE and/or MBE firm(s) listed in the "Set-Aside Contractor Schedule" must be attached to the Request.

This information will be considered as part of your Bid Proposal Form and **failure** to comply with any portion of this requirement within the ten (10) days, including but not limited to **failure** to list or meet the necessary dollar amount or percentage of the bid price, will be cause to **reject** your bid.

- 2.8.5 Percentage of Work Performed by SBE/MBE Contractors and Subcontractors: The percentage of the work performed by the SBE/MBE Contractors and Subcontractors on this project shall not be less than the percentage noted in Subsection 5.1 Amount of Work Required to Be Done by "Set-Aside" Contractors of Section 00 73 38 Commission on Human Rights (CHRO) Contract Compliance Regulations.
- 2.8.6 To view and/or download a Set-Aside Certificate: Go to the DAS Homepage (www.ct.gov/DAS) > Small and Minority Businesses > Apply for Small Business Enterprise or Minority Business Enterprise Certification (SBE or MBE) > View/Search SBE/MBE Directory.

#### 2.9 Insurance Coverages:

- 2.9.1 The Insurance coverages required for this project shall be those listed in Article 35 Contractors Insurance of Section 00 73 13 General Conditions of this Project Manual. See Section 00 41 00 Bid Proposal Form and Section 00 62 16 Certificate of Insurance of this Project Manual for additional details.
- 2.9.2 The Apparent Low Bidder shall submit the Firm's Certificate of Liability Insurance Acord® form within ten (10) business days after receipt of the Letter of Intent from DAS/CS.

#### 3.0 All Other Required Bid Documents, Affidavits, and Certifications:

#### 3.1 Affidavits and Certifications:

#### 3.1.1 Gift and Campaign Contribution Certification - OPM Ethics Form 1: All Bidders

- .1 All Bidders: In accordance with Executive Order No. 49, and pursuant to C.G.S. §§ 4-250, 4-252(c) and 9-612(f)(2), as revised, any principal or key personnel of the person, firm or corporation submitting a bid or proposal for a contract that has a value of \$50,000 or more, shall be required to upload to BizNet a Gift and Campaign Contribution Certification prior to the date and time of the Bid Opening.
- .2 Any bidder or proposer that does not upload the Gift and Campaign Contribution Certification to BizNet prior to the date and time of the Bid Opening as required under this section shall be disqualified and DAS shall award the contract to the next highest ranked proposer or the next lowest responsible qualified bidder or seek new bids or proposals. Failure to upload this form to BizNet prior to the date and time of the Bid Opening shall not be considered a minor irregularity under CGS 4b-95.
- .3 Once uploaded, an updated **Gift and Campaign Contribution Certification** shall be uploaded within **30 days** of any changes to the submitted information.
- **.4 Annually**, on *or* within **two (2)** weeks of the **anniversary** date of the execution of this contract, the Contractor shall upload a completed **Annual Certification** with authorizing resolution. For the purposes of this paragraph, the execution date of the contract will be the date the DAS Commissioner signs the contract.

#### 3.1.2 Consulting Agreement Affidavit – OPM Ethics Form 5: All Bidders

- .1 All Bidders: Pursuant to C.G.S. §§ 4a -81a and 4a -81b, as revised, a Consulting Agreement Affidavit must be completed and uploaded to BizNet prior to the date and time of the Bid Opening for contracts with a value of \$50,000 or more.
- .2 In the event that a Bidder or vendor fails or refuses to upload the **Consulting Agreement Affidavit** to BizNet prior to the date and time of the Bid Opening, as required under C.G.S. § 4a-81, such bidder shall be *disqualified* and the award shall be made to the next lowest responsible qualified bidder or new bids or proposals shall be sought. Failure to upload this form to BizNet **prior** to the date and time of the Bid Opening shall not be considered a minor irregularity under CGS 4b-95.
- .3 Once uploaded, an updated Consulting Agreement Affidavit shall be amended and uploaded not later than (1) thirty (30) days after the effective date of any such change or (2) upon the submittal of any new bid or proposal, whichever is earlier. For the purposes of this paragraph, the execution date of the contract will be the date the DAS Commissioner signs the contract.
- .4 Other Contributions by Individuals. Principals of Investment Services Firms, State Contractors, Principals Of State Contractors, Prospective State Contractors Or Principals Of Prospective State Contractors. Lists. Subcontracts Study. State Officials or Employees: All acquisitions, agreements and contracts are subject to the provisions of the C.G.S. § 9-612 regarding Campaign Contribution or Contributions.

#### 3.1.3 Ethics Affidavit - OPM Ethics Form 6: All Bidders and Apparent Low Bidder

- .1 All Bidders: Pursuant to C.G.S. §§ 1-101mm and 1-101qq, as revised, when DAS/CS is seeking a contract for a large state construction or procurement contract having a cost of more than \$500,000, DAS shall inform all potential consultant and contractor firms of the summary of state ethics laws developed by the Office of State Ethics (OSE) pursuant to C.G.S. § 1-81b. "Large State Contract" means an agreement or a combination or series of agreements between a state agency and a person, firm or corporation, having a total value of more than \$500,000 in a calendar or fiscal year a project for the construction, alteration or repair of any public building or public work. For a Guide to the Code of Ethics For Current or Potential State Contractors go to the Office of State Ethics (OSE) website (www.ct.gov/ethics), then click on the "Publications" link.
- .2 All Bidders: Pursuant to C.G.S. § 1-101qq, as revised, DAS is also required to notify all potential consultant and contractor firms or a large state construction or procurement contract that they must upload an Affirmation of Receipt of State Ethics Laws Summary to BizNet prior to the date and time of the Bid Opening affirming that their key employees have read and understand the summary and agree to comply with the provisions of state ethics law.
- .3 Failure to upload this affidavit to BizNet prior to the date and time of the Bid Opening **shall** result in **rejection** of the bid and-shall not be considered a minor irregularity under CGS 4b-95.
- .4 Apparent Low Bidder: Furthermore, the Apparent Low Bidder shall provide the Summary of the State Ethics Laws to each Named Subcontractor and any other Subcontractor or Subconsultant with a contract valued over \$500,000 and obtain a Subcontractor and Subconsultant State Ethics Affidavit stating that the key personnel of the subcontractor have read, understand, and agree to comply with provisions of the state ethics laws. The Apparent Low Bidder shall submit such subcontractor(s) affidavits to the DAS/CS Office of Legal Affairs, Policy, and Procurement within ten (10) business days after receipt of the Letter of Intent from DAS/CS.

#### 3.1 Affidavits and Certifications Forms (continued):

#### 3.1.4 Iran Certification - OPM Ethics Form 7: All Bidders

- .1 All Bidders: Pursuant to C.G.S. § 4-252a, when DAS/CS is seeking a contract for a large state construction or procurement contract having a cost of more than \$500,000, an Iran Certification must be completed and uploaded to BizNet prior to the date and time of the Bid Opening.
- Pursuant to C.G.S. § 4-252a, "This form must always be submitted with the bid or proposal, or if there was no bid process, with the resulting contract, regardless of where the principal place of business is located. Entities whose principal place of business is located outside of the United States are required to complete the entire form, including the certification portion of the form. United States subsidiaries of foreign corporations are exempt from having to complete the certification portion of the form. Those entities whose principal place of business is located inside of the United States must also fill out the form, but do not have to complete the certification portion of the form."

#### 3.1.5 Nondiscrimination Certification – Form A, B, C, D, or E: All Bidders

- .1 All Bidders: Pursuant to C.G.S. §§ 4a-60 and 4a-60a, as amended, a contractor must provide an awarding State agency with written representation or documentation that certifies the contractor complies with the State's nondiscrimination agreements and warranties prior to the award of any contract with the State. A Nondiscrimination Certification is required for all State contracts, regardless of type, term, cost or value. The appropriate form must be uploaded to BizNet prior to the date and time of the Bid Opening.
- .2 Once uploaded, an updated **Nondiscrimination Certification** shall be uploaded within **30 days** of any changes to the submitted information.
- .3 Annually, on or within two (2) weeks of the anniversary date of the execution of this contract, the Contractor shall upload a completed Annual Certification with authorizing resolution. For the purposes of this paragraph, the execution date of the contract will be the date the DAS Commissioner signs the contract.
- **3.1.6** For instructions on how to electronically download *and* upload **Affidavits and Non-Discrimination Forms**, go to the DAS Homepage (<a href="www.ct.gov/DAS">www.ct.gov/DAS</a>) > Doing Business with the State > Create a BizNet Account for Doing Business with the State > Documents/Forms > Vendor Guide to Uploading Affidavits and Nondiscrimination Forms Online.

#### 3.2 Security For Faithful Performance:

#### 3.2.1 Certified Check or Bid Bond: All Bidders

- .1 All Bidders for bids in excess of \$50,000 shall submit either a Certified Check or a Bid Bond, in the form required by the awarding authority. See Section 00 43 16 Standard Bid Bond in BizNet for a template and important instructions regarding submitting the Bid Bond or Certified Check. Complete and upload Section 00 43 16 Standard Bid Bond to Biznet prior to the date and time of the Bid Opening for either the Bid Bond option or the Certified Check option.
- .2 Certified Check Option: The Certified Check shall be drawn to the order of "Treasurer, State of Connecticut", in which it is understood shall be cashed and the proceeds thereof used so far as may be necessary to reimburse the State of Connecticut for losses and damages arising by virtue of the Bidder's failure to file the required Bonds and execute the required contract if this proposal is accepted by the Awarding Authority.
- .3 Bid Bond Option: The Bid Bond shall be in the form required by the awarding authority, having as surety thereto such surety company or companies acceptable to the DAS Commissioner and as are authorized to do business in this State, for an amount not less than 10 percent of the bid.
- **.4 Return of Certified Check:** All **checks** submitted by **unsuccessful** Bidders shall be returned to them *after* the contract has been awarded.
- .5 Failure to submit the Bid Bond or Certified Check **prior** to the date and time of the Bid Opening **shall** cause **rejection** of the bid and shall not be considered a minor irregularity under CGS 4b-95.
- **.6 Forfeiture of Certified Check or Bid Bond: Failure** of the successful bidder to execute a contract awarded as specified and bid shall result in the **forfeiture** of the certified check or bid bond.
- 3.2.2 Performance Bond: Apparent Low Bidder: Within ten (10) business days after receipt of the Letter of Intent from DAS/CS, the Apparent Low Bidder shall substitute for the certified check or bid bond accompanying its bid an executed performance bond, in the amount not less than 100 percent of the contract price, conditioned upon the faithful performance of the contract, and having as surety thereto such surety company or companies satisfactory to the Commissioner and as are authorized to transact business in this State. This bond is to be furnished pursuant to C.G.S. § 49-41, as revised. See Section 00 92 10 Additional Forms of this Project Manual for a template.
- 3.2.3 Labor and Material Bond: Apparent Low Bidder: Within ten (10) business days after receipt of the Letter of Intent from DAS/CS, the Apparent Low Bidder shall submit a labor and material bond in the amount not less than 100 percent of the contract price which shall be binding upon the award of the contract to such bidder, with surety or sureties satisfactory to the Commissioner and as are authorized to transact business in this State, for the protection of persons supplying labor or materials in the prosecution of the work provided for in the contract for the use of each such person. Any such bond furnished shall have as principal the name of the successful Bidder. This bond is to be furnished pursuant to C.G.S. § 49-41, as revised. See Section 00 92 10 Additional Forms of this Project Manual for a template.

### 3.2 Security For Faithful Performance (continued):

- 3.2.4 The following section of the General Statutes of Connecticut, as revised, is inserted as information concerning this bond and will be incorporated into the Contract for the Work:
  - **C.G.S.** § 49-41a. Enforcement of payment by general contractor to subcontractor and by subcontractor to his subcontractors. (a) When any public work is awarded by a contract for which a payment bond is required by section 49-41, the contract for the public work shall contain the following provisions: (1) A requirement that the general contractor, within thirty days after payment to the contractor by the State or a municipality, pay any amounts due any subcontractor, whether for labor performed or materials furnished, when the labor or materials have been included in a requisition submitted by the contractor and paid by the State or a municipality; (2) a requirement that the general contractor shall include in each of its subcontracts a provision requiring each subcontractor to pay any amounts due any of its subcontractors, whether for labor performed or materials furnished, within thirty days after such subcontractor receives a payment from the general contractor which encompasses labor or materials furnished by such subcontractor.
  - (b) If payment is not made by the general contractor or any of its subcontractors in accordance with such requirements, the subcontractor shall set forth his claim against the general contractor and the subcontractor of a subcontractor shall set forth its claim against the subcontractor through notice by registered or certified mail. Ten days after the receipt of that notice, the general contractor shall be liable to its subcontractor, and the subcontractor shall be liable to its subcontractor, for interest on the amount due and owing at the rate of one percent per month. In addition, the general contractor, upon written demand of its subcontractor, or the subcontractor, upon written demand of its subcontractor, shall be required to place funds in the amount of the claim, plus interest of one per cent, in an interest-bearing escrow account in a bank in this State, provided the general contractor or subcontractor may refuse to place the funds in escrow on the grounds that the subcontractor has not substantially performed the work according to the terms of his or its employment. In the event that such general contractor or subcontractor refuses to place such funds in escrow, and the party making a claim against it under this section is found to have substantially performed its work in accordance with the terms of its employment in any arbitration or litigation to determine the validity of such claim, then such general contractor or subcontractor shall pay the attorney's fees of such party.
  - (c) No payment may be withheld from a subcontractor for work performed because of a dispute between the general contractor and another contractor or subcontractor.
  - (d) This section shall not be construed to prohibit progress payments prior to final payment of the contract and is applicable to all subcontractors for material or labor whether they have contracted directly with the general contractor or with some other subcontractor on the work.
- 3.2.5 Surety Sheet: Apparent Low Bidder: Within ten (10) business days *after* receipt of the Letter of Intent from DAS/CS, the Apparent Low Bidder shall submit a Surety Sheet that provides information regarding the Surety Company and Agent. See Section 00 92 10 Additional Forms of this Project Manual for a template.

### 3.3 Certificate (of Authority):

- **3.3.1** All Bidders for bids in excess of \$50,000 shall upload a signed and scanned Section 00 40 14 Certificate (of Authority) to BizNet prior to the date and time of the Bid Opening. See BizNet for a template.
- 3.3.2 The Apparent Low Bidder shall submit a second Certificate (of Authority) within ten (10) business days after receipt of the Letter of Intent from DAS/CS.

### 3.4 Security Requirements for CT Department of Correction (CT DOC) Facilities:

- 3.4.1 All Bidders for Projects at a CT DOC Facility shall read and comply with Section 00 73 63 CT DOC Security Requirements for Contract Forces on CT DOC Facilities.
- 3.4.2 NEW: All Bidders for Projects at a CT DOC Facility: Prior to the Pre-Bid Meeting, all Bidders shall download the "Security Background Questionnaire" from the CT DOC website (<a href="www.ct.gov/doc">www.ct.gov/doc</a>, under "Forms"), complete and submit the form as directed, and obtain approval, otherwise admission to the Pre-Bid Meeting will be denied. It is recommended that the approved form be brought as evidence of approval to attend the Pre-Bid Meeting.

### 3.5 Affirmative Action Plan & Employment Information Form (DAS-45): Apparent Low Bidder

- 3.5.1 For Projects greater than \$500,000 and/or Firms with 50 or more employees, the Apparent Low Bidder shall submit the Firm's Affirmative Action Plan and Employment Information Form (DAS-45) to CHRO within fifteen (15) calendar days after receipt of the "Request for the Affirmative Action Plan and Employment Information Form Letter" from DAS/CS. See Section 00 73 38 Commission on Human Rights and Opportunities/ Contract Compliance Regulations.
- 3.5.2 The Apparent Low Bidder *shall* submit a copy of the Transmittal Letter to the DAS/CS Office of Legal Affairs, Policy, and Procurement within *fifteen (15) calendar days after* receipt of the "Request for the *Affirmative Action Plan* and *Employment Information Form* Letter" from DAS/CS.

### 3.6 Prevailing Wage: Apparent Low Bidder

- 3.6.1 The Apparent Low Bidder shall submit the "Contractor's Wage Certification Form" to CT Department of Labor (CT DOL) within fifteen (15) calendar days after receipt of the "Request for the Affirmative Action Plan and Employment Information Form Letter" from DAS/CS. See Section 00 73 44 Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification of this Project Manual.
- 3.6.2 Each contractor who is awarded a contract on or after October 1, 2002 shall be subject to provisions of C.G.S. § 31-53, as revised. See Section 00 73 44 Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification of this Project Manual.
- 3.6.3 Annual Adjustment Of Prevailing Wage Rates: In determining bid price, consideration should be given to C.G.S. § 31-53 and 31-55a, as revised, regarding annual adjustment of prevailing wage rates. Annual adjustments of prevailing wage rates will not be considered a matter for a contract amendment.

### 3.7 **NEW PROCESS:** General Permit for the Discharge of Stormwater & Dewatering Wastewaters from Construction Activities: Apparent Low Bidder

- 3.7.1 All DAS/CS construction projects disturbing one or more total acres of land area on a site regardless of project phasing must file a Department of Energy and Environmental Protection (DEEP) General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (DEEP-WPED-GP-015) ("Construction Stormwater General Permit") registration and Stormwater Pollution Control Plan (SPCP) with the DEEP. The DAS/CS Architect/Engineer (A/E) shall be responsible for registering the Construction Stormwater General Permit and SPCP through the online DEEP ezFile Portal prior to bidding.
- 3.7.2 Once the Apparent Low Bidder is under contract with DAS/CS, and prior to the commencement of any construction activities, the Apparent Low Bidder ("Contractor") shall be required to provide the necessary information from all applicable contractors and/or subcontractors working on the Project to the DAS/CS A/E in order to finalize the SPCP and transfer the Construction Stormwater General Permit obligations to the Contractor.
- **3.7.3** All Contractors and Subcontractors listed on the SPCP shall be required to sign the SPCP "Contractor Certification Statement" and License Transfer Form *prior* to commencement of any construction activity.

### 3.8 Section 00 52 73 Subcontract Agreement Forms: Apparent Low Bidder

- 3.8.1 The Apparent Low Bidder shall submit a completed Section 00 52 73 Subcontract Agreement Form of this Project Manual for *each* Named Subcontractor within ten (10) Business Days after receipt of the "Letter of Intent" from DAS/CS. This information *shall* be considered as part of the Bid Proposal Form and failure to comply with any portion of this requirement may cause rejection of the bid.
- 3.8.2 Each Named Subcontractor shall be the matter of a Subcontract as required by C.G.S. § 4b-96.

### 3.9 Non-Resident Contractors and Taxation: Apparent Low Bidder

- 3.9.1 Nonresident contractors must comply with the provisions C.G.S. § 12-430 (7), Procedures for Nonresident Contractors, and the regulations established pursuant to that section. See Section 00 92 30 Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors of this Project Manual for additional details.
- 3.9.2 Apparent Low Bidder who is a Nonresident Contractor: Within ten (10) business days after receipt of the "Letter of Intent" from DAS/CS, a certificate(s) from DRS must be provided which evidences that C.G.S. §12-430 for nonresident contractors has been met. As described in Section 00 92 30 "Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors", Verified Nonresident General/Prime Contractors must submit a copy of their "Notice of Verified Status" (Verification Letter) from DRS. Unverified Nonresident General/Prime Contractors must submit a copy of Form AU-965 "Acceptance of Surety Bond" from DRS.

### 3.10 Certificate of Legal Existence: Apparent Low Bidder

3.10.1 A corporation that is awarded the contract must comply with the laws of this State regarding the procurement of a certificate of authority to transact business in this State from the Secretary of the State. A "Certificate of Legal Existence" which is not older than ninety (90) calendar days from the date of the contract signing must be filed with the DAS/CS Office of Legal Affairs, Policy, and Procurement within ten (10) business days after receipt of the "Letter of Intent" from DAS/CS.

### 3.11 State Election Enforcement Commission (SEEC) Form 10: Apparent Low Bidder

- 3.11.1 The Apparent Low Bidder shall submit a State Election Enforcement Commission's (SEEC) Form 10 "Notice to Executive Branch State Contractors and Prospective State Contractors of Campaign Contribution and Solicitation Limitations" within ten (10) business days after receipt of the "Letter of Intent" from DAS/CS for contracts with a value of \$50,000 or more.
- 3.11.2 Pursuant to C.G.S. § 9-612, as revised, a State Contract means an agreement or contract with the state or any state agency or any quasi-public agency having a value in a calendar year of \$50,000 or more, or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this submission in response to the State's solicitation expressly acknowledges receipt of, and must submit in writing, the SEEC Form 10 notice advising prospective state contractors of the state campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice.
- **3.11.3** For instructions on how to download "**SEEC Form 10**", go to the SEEC Homepage (<a href="www.ct.gov/seec">www.ct.gov/seec</a>); click on "Forms" at the top of the page; click on "Contractor Reporting Forms"; click on "SEEC Form 10" and follow the directions.

### 3.12 OSHA Training Course: Successful Bidder

3.12.1 Pursuant to C.G.S. §. 31-53b (a), as revised, each contract entered into for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public building project by the state or any of its agents, or by any political subdivision of the state or any of its agents, where the total cost of all work to be performed by all contractors and subcontractors in connection with the contract is at least one hundred thousand dollars (\$100,000), shall contain a provision requiring that, not later than thirty (30) days after the date such contract is awarded, each contractor furnish proof to the Labor Commissioner that all employees performing manual labor on or in such public building, pursuant to such contract, have completed a course of at least ten (10) hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, in the case of telecommunications employees, have completed at least ten (10) hours of training in accordance with 29 CFR 1910.268.

### 4.0 Nondiscrimination and Affirmative Action

This contract is subject to Federal and state laws, including Title VII of the 1964 Civil Rights Act, 42 U.S.C. § 2000e-2(a)(1), and the Connecticut Fair Employment Practices Act, C.G.S. §46a-60 et seq., prohibit various forms of discrimination and illegal harassment in employment.

### 4.1 Nondiscrimination and Affirmative Action Provisions:

- 4.1.1 This section is inserted in connection with C.G.S. § 4a-60, as revised.
- **4.1.2** References in this section to "contract" **shall** mean this Contract and references to "contractor" **shall** mean the Contractor/Bidder.
- 4.1.3 C.G.S. § 4a-60, as revised:
- (a) Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions:
- (1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut; and the contractor further agrees to take affirmative action to insure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved;
- (2) The contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the commission;
- (3) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the commission advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

- (4) The contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e and 46a-68f; and
- (5) The contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56.
- (b) If the contract is a public works contract, the contractor agrees and warrants that he will make good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials on such public works project.
- (c) (1) Any contractor who has one or more contracts with the state or a political subdivision of the state that is valued at less than fifty thousand dollars for each year of the contract shall provide the state or such political subdivision of the state with a written or electronic representation that complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section, provided if there is any change in such representation, the contractor shall provide the updated representation to the state or such political subdivision not later than thirty days after such change.
- (2) Any contractor who has one or more contracts with the state or a political subdivision of the state that is valued at fifty thousand dollars or more for any year of the contract shall provide the state or such political subdivision of the state with any one of the following:
- (A) Documentation in the form of a company or corporate policy adopted by resolution of the board of directors, shareholders, managers, members or other governing body of such contractor that complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section;
- (B) Documentation in the form of a company or corporate policy adopted by a prior resolution of the board of directors, shareholders, managers, members or other governing body of such contractor if (i) the prior resolution is certified by a duly authorized corporate officer of such contractor to be in effect on the date the documentation is submitted, and (ii) the head of the agency of the state or such political subdivision, or a designee, certifies that the prior resolution complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section; or

### 4.1.3 - C.G.S. § 4a-60, as revised: (continued)

- (C) Documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson or other corporate officer duly authorized to adopt company or corporate policy that certifies that the company or corporate policy of the contractor complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section and is in effect on the date the affidavit is signed.
- (3) Neither the state nor any political subdivision shall award a contract to a contractor who has not provided the representation or documentation required under subdivisions (1) and (2) of this subsection, as applicable. After the initial submission of such representation or documentation, the contractor shall not be required to resubmit such representation or documentation unless there is a change in the information contained in such representation or documentation. If there is any change in the information contained in the most recently filed representation or updated documentation, the contractor shall submit an updated representation or documentation, as applicable, either (A) not later than thirty days after the effective date of such change, or (B) upon the execution of a new contract with the state or a political subdivision of the state, whichever is earlier. Such contractor shall also certify, in accordance with subparagraph (B) or (C) of subdivision (2) of this subsection, to the state or political subdivision, not later than fourteen days after the twelve-month anniversary of the most recently filed representation, documentation or updated representation or documentation, that the representation on file with the state or political subdivision is current and accurate.
- (d) For the purposes of this section, "contract" includes any extension or modification of the contract, "contractor" includes any successors or assigns of the contractor, "marital status" means being single, married as recognized by the state of Connecticut, widowed, separated or divorced, and "mental disability" means one or more mental disorders, as defined in the most recent edition of the American Psychiatric Association's "Diagnostic and Statistical Manual of Mental Disorders", or a record of or regarding a person as having one or more such disorders. For the purposes of this section, "contract" does not include a contract where each contractor is (1) a political subdivision of the state, including, but not limited to, a municipality, (2) a quasi-public agency, as defined in section 1-120, (3) any other state, as defined in section 1-267, (4) the federal government, (5) a foreign government, or (6) an agency of a subdivision, agency, state or government described in subparagraph (1), (2), (3), (4) or (5) of this subsection.
- (e) For the purposes of this section, "minority business enterprise" means any small contractor or supplier of materials fifty-one per cent or more of the capital stock, if any, or assets of which is owned by a person or persons: (1) Who are active in the daily affairs of the enterprise, (2) who have the power to direct the management and policies of the enterprise, and (3) who are members of a minority, as such term is defined in subsection (a) of section 32-9n; and "good faith" means that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations. "Good faith efforts" shall include, but not be limited to, those reasonable initial efforts necessary to comply with statutory or regulatory requirements and additional or substituted efforts when it is determined that such initial efforts will not be sufficient to comply with such requirements.
- (f) Determination of the contractor's good faith efforts shall include but shall not be limited to the following factors: The contractor's employment and subcontracting policies, patterns and practices; affirmative advertising, recruitment and training; technical assistance activities and such other reasonable activities or efforts as the commission may prescribe that are designed to ensure the participation of minority business enterprises in public works projects.

- (g) The contractor shall develop and maintain adequate documentation, in a manner prescribed by the commission, of its good faith efforts.
- (h) The contractor shall include the provisions of subsections (a) and (b) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

### 4.2 Nondiscrimination Provisions Regarding Sexual Orientation:

- 4.2.1 This section is inserted in connection with C.G.S. § 4a-60a, as revised.
- **4.2.2** References in this section to "contract" **shall** mean this Contract and references to "contractor" **shall** mean the Contractor/Bidder.

### 4.2.3 C.G.S. § 4a-60a, as revised:

- (a) Every contract to which the state or any political subdivision of the state other than a municipality is a party shall contain the following provisions:
- (1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of sexual orientation, in any manner prohibited by the laws of the United States or of the state of Connecticut, and that employees are treated when employed without regard to their sexual orientation:
- (2) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;
- (3) The contractor agrees to comply with each provision of this section and with each regulation or relevant order issued by said commission pursuant to section 46a-56; and
- (4) The contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor which relate to the provisions of this section and section 46a-56.
- (b) (1) Any contractor who has one or more contracts with the state or a political subdivision of the state that is valued at less than fifty thousand dollars for each year of the contract shall provide the state or such political subdivision of the state with a written representation that complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section.
- (2) Any contractor who has one or more contracts with the state or a political subdivision of the state that is valued at fifty thousand dollars or more for any year of the contract shall provide the state or such political subdivision of the state with any of the following:
- (A) Documentation in the form of a company or corporate policy adopted by resolution of the board of directors, shareholders, managers, members or other governing body of such contractor that complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section;
- (B) Documentation in the form of a company or corporate policy adopted by a prior resolution of the board of directors, shareholders, managers, members or other governing body of such contractor if (i) the prior resolution is certified by a duly authorized corporate officer of such contractor to be in effect on the date the documentation is submitted, and (ii) the head of the agency of the state or such political subdivision, or a designee, certifies that the prior resolution complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section; or
- (C) Documentation in the form of an affidavit signed under penalty of false statement by a chief executive officer, president, chairperson or other corporate officer duly authorized to adopt company or corporate policy that certifies that the company or corporate policy of the contractor complies with the nondiscrimination agreement and warranty under subdivision (1) of subsection (a) of this section and is in effect on the date the affidavit is signed.
- (3) Neither the state nor any political subdivision shall award a contract to a contractor who has not provided the representation or documentation required under subdivisions (1) and (2) of this subsection, as applicable. After the initial submission of such representation or documentation, the contractor shall not be required to resubmit such representation or documentation unless there is a change in the information contained in such representation or documentation. If there is any change in the information contained in the most recently filed representation or updated documentation, the contractor shall submit an updated representation or documentation, as applicable, either (A) not later than thirty days after the effective date of such change, or (B) upon the execution of a new contract with the state or a political subdivision of the state, whichever is earlier.

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- Such contractor shall also certify, in accordance with subparagraph (B) or (C) of subdivision (2) of this subsection, to the state or political subdivision, not later than fourteen days after the twelve-month anniversary of the most recently filed representation, documentation or updated representation or documentation, that the representation on file with the state or political subdivision is current and accurate.
- 4) For the purposes of this section, "contract" includes any extension or modification of the contract, and "contractor" includes any successors or assigns of the contractor. For the purposes of this section, "contract" does not include a contract where each contractor is (A) a political subdivision of the state, including, but not limited to, a municipality, (B) a quasi-public agency, as defined in section 1-120, (C) any other state, as defined in section 1-267, (D) the federal government, (E) a foreign government, or (F) an agency of a subdivision, agency, state or government described in subparagraph (A), (B), (C), (D) or (E) of this subdivision.
- (c) The contractor shall include the provisions of subsection (a) of this section in every subcontract or purchase order entered into in order to fulfill any obligation of a contract with the state and such provisions shall be binding on a subcontractor, vendor or manufacturer unless exempted by regulations or orders of the commission. The contractor shall take such action with respect to any such subcontract or purchase order as the commission may direct as a means of enforcing such provisions including sanctions for noncompliance in accordance with section 46a-56; provided, if such contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the commission, the contractor may request the state of Connecticut to enter into any such litigation or negotiation prior thereto to protect the interests of the state and the state may so enter.

End of Section 00 21 13 Instructions to Bidders

### **Pre-Bid Meeting Agenda:**

DAS ● Construction Services ● Office of Legal Affairs, Policy, and Procurement

### 1.0 Pre-Bid Meeting:

The Architect will conduct a Pre-Bid Meeting.

For the Pre-Bid Meeting Date, Time, and Location see Section 00 11 16 Invitation To Bid for this Specific Bid.

# 1.2.1 General Contractor: Attendance at the Pre-Bid Meeting is strongly encouraged. At the Pre-Bid Meeting, all prospective bidders shall sign his or her name on the official roster and list the name and address of the company he or she represents. 1.2.2 Subcontractors: Attendance at the Pre-Bid Meeting is recommended. 1.2.3 Pre-Bid Meeting Sign-in Sheet: It is strongly encouraged that all attendees sign the Pre-Bid Meeting Sign-in Sheet.

- 1.3 Site/Facility Visit or Walkthrough: Please do not make any Site/Facility Visits without notifying the DAS/CS Project Manager prior to your visit.
  - 1.3.1 A Site/Facility Visit or Walkthrough is scheduled for the Pre-Bid Meeting
  - 1.3.2 A Site/Facility Visit or Walkthrough is NOT scheduled for the Pre-Bid Meeting

### 1.4 Bidder Questions:

1.1

1.4.1 Submit <u>written</u> questions to be discussed at the Pre-Bid Meeting a <u>minimum of two (2) Calendar Days</u> <u>prior</u> to Pre-Bid Meeting date. See the Invitation to Bid for instructions on submitting questions.

<u>IMPORTANT NOTE:</u> In accordance with DAS Regulations, **no** participants in any Selection, Proposal, or Bidding process, including User Agency representative(s), shall communicate with any potential Offeror prior to, during, or upon conclusion of the entire Selection, Proposal, or Bidding procedure, with the exception of information necessary to complete the administrative steps of the Selection process.

### 2.0 Pre-Bid Meeting Agenda:

The Pre-Bid Meeting Agenda will include a review of topics, <u>as applicable to the Project</u>, which may affect proper preparation and submittal of bids, including, but not limited to, the following:

### 2.1 Introduction of Participants:

- 2.1.1 Architect/Engineer: John Doherty, Mitchell/Giurgola Architects, LLP
- 2.1.2 CA: Christopher Haley, The Whiting Turner Contracting Company
- 2.1.3 Agency Represenative: Lisa Humble, Department of Administrative Services, Construction Services

### 2.0 Pre-Bid Meeting Agenda (continued):

2.2	Project Summary:			
	2.2.1 Summary of Work: See General Requirements Section 01 11 00			
	2.2.2 Temporary Facilities and Controls: See General Requirements Section 01 50 00			
	2.2.3	2.2.3 Work Sequence: See General Requirements Section 01 11 00		
	2.2.4	Contractor Use of Premises: See General Requirements Section 01 11 00		
	2.2.5	5 Project Schedule		
	2.2.6	Contract Time		
	2.2.7	<b>Liquidated Damages:</b> See General Conditions Section 00 73 13, Articles 1 and 8, and 00 41 00 Bid Proposal Form.		

2.3	Procu	Procurement and Contracting Requirements:		
	2.3.1	Section 00 11 16 – Invitation to Bid		
•	2.3.2	Section 00 21 13 – Instructions to Bidders		
·	2.3.3 Section 00 41 00 – Bid Proposal Form			
·	2.3.4 Section 00 41 10 – Bid Package Submittal Requirements			
	2.3.5	Section 00 30 00 – General Statements for Available information		
	2.3.6	Division 50 – Project-Specific Available Information		
	2.3.7	Bonding		
	2.3.8	Insurance		
	2.3.9	Bid Security		
·	2.3.10	Notice of Award		

2.4	Com	Communication During Bidding Period:			
	2.4.1 Obtaining Bid Documents				
<ul> <li>2.4.2 Access to DAS Website, BizNet, and State Contracting Portal</li> <li>2.4.3 Bidder's Requests for Information: See General Requirements Sections 01 26 00</li> <li>2.4.4 Substitution Procedures (Prior to Bid): See General Requirements Section 01 25 00 Conditions Section 00 73 13, Article 15.</li> </ul>					
			prior to the Bid Due Date. The information on all materials shall be consistent with the info		The Owner will consider Pre-Bid Equals or Substitutions Requests, if made <b>fourteen (14)</b> Calendar Days <b>prior</b> to the <b>Bid Due Date</b> . The information on all materials shall be consistent with the information herein.
					<b>Substitutions following Contract Award:</b> See General Requirements Section 01 25 00 & General Conditions Section 00 73 13, Article 15.
		Subject to the Architect or Engineer's determination, if the material or equipment is Equal to the one specified or pre-qualified and the DAS/CS Project Manager's approval of such determination, Substitution of Material or Equipment may be allowed after the Letter of Award is issued, as specified in the Conditions Section 00 73 13, Article 15.			
	2.4.6 Addenda Procedures: See Item No. 2.7 of this form				

		2.0 Pre-Bid Meeting Agenda (continued):					
2.5	Contract Considerations:						
	2.5.1	Allowances: See General Requirements Section 01 20 00					
	2.5.2	.2 Unit Prices: See General Requirements Section 01 20 00					
	2.5.3	2.5.3 Supplemental Bid: See General Requirements Section 01 23 13 and 00 41 00 Bid Proposal Form.					
2.6	Sepa	rate Contracts:					
	2.6.1	Work by Owner					
	2.6.2	Work of Other Contracts					
2.7	Post	Pre-Bid Meeting Addendum:					
2.7	Post 2.7.1	Pre-Bid Meeting Addendum:  No Interpretations of the meaning of the plans, specifications or other contract documents will be made orally at any time. Every bidder request for such interpretation shall be in writing to the awarding authority and to be given consideration shall be received at least fourteen (14) Calendar Days prior to the Bid Due Date. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be posted on the State Contracting Portal.					
2.7		No Interpretations of the meaning of the plans, specifications or other contract documents will be made orally at any time. Every bidder <u>request</u> for such interpretation <u>shall</u> be in writing to the awarding authority and to be given consideration <u>shall</u> be received at least fourteen (14) Calendar Days <u>prior</u> to the Bid Due Date. Any and all such interpretations and any supplemental instructions will be in the form of written					
2.7	2.7.1	No Interpretations of the meaning of the plans, specifications or other contract documents will be made orally at any time. Every bidder request for such interpretation shall be in writing to the awarding authority and to be given consideration shall be received at least fourteen (14) Calendar Days prior to the Bid Due Date. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be posted on the State Contracting Portal.					
	2.7.1	No Interpretations of the meaning of the plans, specifications or other contract documents will be made orally at any time. Every bidder request for such interpretation shall be in writing to the awarding authority and to be given consideration shall be received at least fourteen (14) Calendar Days prior to the Bid Due Date. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be posted on the State Contracting Portal.  Other Bidder Questions					

# 3.1 Recording and Distribution of Pre-Bid Meeting Minutes: 3.1.1 The Architect is responsible for conducting the Pre-Bid Meeting and will record and distribute meeting minutes to attendees and others known by the issuing office to have received a complete set of Procurement and Contracting Documents. 3.2 Pre-Bid Meeting Minutes as "Available Information" 3.2.1 Minutes of the Pre-Bid Meeting are issued as "Available Information" and do not constitute a modification to the Procurement and Contracting Documents. Modifications to the Procurement and Contracting Documents are issued by written Addendum only. 3.3.1 Minutes will include the list of meeting attendees.

End of Section 00 25 13 Pre-Bid Meeting Agenda

3.4

3.4.1

**List of Planholders:** 

Minutes will include the list of planholders.

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### 00 30 00 **GENERAL STATEMENTS FOR AVAILABLE INFORMATION** NOT USED

- A. Summary: This Section is not a Bidding Document, but directs Bidders to Division 50 00 00 Project-Specific Available Information that provides project-specific information available for review by Bidders.
- Bidder Responsibility: The Bidder is responsible for information, including but not limited to, any В. interpretations and opinions of information contained in any plans, reports, evaluations, and logs, or shown on any drawings, or indicated on any drawings. Division 50 00 00 Project-Specific Available **Information** is provided to Bidders for their use in the preparation of a Bid.
- Measurement: Division 50 00 00 Project-Specific Available Information shall be utilized for C. determination of payment for the Work during construction of the project.
- D. Payment: No separate payment will be made for any Work under Division 50 00 00 Project-Specific Available Information.
- Related Sections: Drawings and general provisions of the Contract, including General and E. Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. See Division 50 00 00 Project-Specific Available Information for information that is available for this Project.
- F. Please read the following General Statement(s) that describe the type of project-specific information that is available in Division 50 00 00 Project-Specific Available Information:

00 30 00	General Statements For Available Information Table Of Contents	Not Used
00 30 10	General Statement for Existing Conditions Survey	
00 30 20	General Statement for Environmental Assessment Information	
00 30 30	General Statement for Hazardous Building Materials Inspection and Inventory	
00 30 40	General Statement for Subsurface Geotechnical Report	
00 30 50	General Statement for Elevator Agreement	$\boxtimes$
00 30 60	General Statement for FM Global Checklist for Roofing Systems	
00 30 70	General Statement for "Statement of Special Inspections"	
00 30 80	General Statement for Additional Information	

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### 00 30 10 GENERAL STATEMENT FOR EXISTING CONDITIONS SURVEY

Not Used □

- A. The "Existing Conditions Survey" for this project is located in the drawings.
  - The information is made available for the convenience of all Bidders and is not a part of the Contract.
  - 2. All Bidders must interpret this information according to their own judgment and acknowledge that they are not relying upon the information shown as accurately describing the conditions which may be found to exist.
  - **3.** Other components of the information, including but not limited to recommendations, may not be relied upon by the Bidders. The Owner shall not be responsible for any interpretation.
  - **4.** All Bidders further acknowledge that they assume all risk contingents upon the nature of the existing conditions which shall be actually be encountered by them.
  - All Bidders should visit the site and become acquainted with all existing conditions in relationship to this information and may make their own investigations to satisfy themselves as to the existing conditions. Such investigations shall be conducted only under time schedules and arrangements approved in advance by the Owner.

### 00 30 20 GENERAL STATEMENT FOR ENVIRONMENTAL ASSESSMENT INFORMATION

Not Used ⊠

A. Not Used

### 00 30 30 GENERAL STATEMENT FOR HAZARDOUS BUILDING MATERIALS INSPECTION Not Used AND INVENTORY

- A. Related Documents:
  - Section 01 20 00 Contract Considerations
  - Section 01 35 16 Alteration Project Procedures
  - Section 02 41 19 Selective Demolition & Alteration Work
  - Section 02 82 13 Asbestos Abatement
  - Section 02 82 14 Asbestos Roofing Abatement
  - Section 02 83 19 Lead Paint Awareness
  - Section 02 84 16 Handling of Lighting Ballasts and Lamps Containing PCBS and Mercury
- B. Description of Work:

### 1. Work Involving Asbestos Containing Material (ACM):

- 1.1 Testing for asbestos has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair. Results of the asbestos testing are summarized in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections.
- 1.2 Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of asbestos. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.

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### 2. Work Involving Lead-Based Paint (LBP):

- 2.1 This facility was constructed prior to 1978, it is likely to have painted surfaces containing lead-based paint (LBP).
- 2.2 Testing for lead-based paint has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair. Results of the LBP testing are summarized in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of LBP.
- 2.3 The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.

### 3. Work Involving Polychlorinated Biphenyls (PCBs) in Building Materials:

- 3.1 This facility was constructed between 1950 and 1978, it is likely to have caulk and/or glazing containing PCBs.
- 3.2 Testing for PCBs has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair. Results of the PCB testing are summarized in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections.
- The Contractor shall be responsible for verification of all field conditions affecting 3.3 performance of the Work.
- 4. Work Involving Hazardous Materials, Wastes, and Items and Universal Wastes (Including Products Containing Persistent Bioaccumulative Toxic Chemicals (PBT's)):
  - 5.1 A Hazardous Materials, Wastes, and Items and Universal Wastes Inventory for products containing Persistent Bioaccumulative Toxic Chemicals (PBTs) such as Polychlorinated Biphenols (PCBs), Di-2-ethylhexyl Phthalate (DEHP), and Mercury, has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair. Results of the inventory are summarized in **Division** 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections.
  - 5.2 The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.
  - 5.3 Examples of Hazardous Materials, Wastes, and Items and Universal Wastes include, but are not limited to, fluorescent light fixtures and exit signs, ballasts, high-intensity discharge (HID) lamps, certain types of construction products containing vinyl, mercury containing electrical switches, gauges, and thermostats; PCB Capacitors, refrigerants, pressurized cylinders, smoke/carbon dioxide detectors, used electronics, batteries, transformer/hydraulic fluids/oils, and miscellaneous household hazardous waste.
  - For the purposes of this subsection, PCB's in building material such as caulk and 5.4 glazing or any other type of material not listed above is not applicable to this subsection.

### 00 30 40 GENERAL STATEMENT FOR SUBSURFACE GEOTECHNICAL REPORT

Not Used

- A. Related Documents:
  - Division 02 Site Construction.
- В. **Description of Work:** 
  - **Boring Logs:**

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1.1 The Boring Logs have been prepared for the site of this Work and are in the Contract Documents.

### 2. Geotechnical Report(s):

- The Subsurface Geotechnical Report(s) has been prepared for the site of this Work 2.1 and is located in Division 50 00 00 Project-Specific Available Information, Section 50 40 00 Subsurface Geotechnical Report at the end of the Technical Specification Sections.
- 2.2 The Contractor must interpret this report according to his own judgment and acknowledges that he is not relying upon the data as accurately describing the subsurface conditions which may be found to exist.
- 2.3 The Contractor further acknowledges that he assumes all risk contingents upon the nature of the subsurface conditions which shall be actually encountered by him in performing the Work of this Contract.
- 2.4 The Contractor should visit the site and become acquainted with all existing conditions and may make their own subsurface investigations to satisfy themselves as to the subsurface conditions. Such investigations shall be conducted only under time schedules and arrangements approved in advance by the Owner.

### **GENERAL STATEMENT FOR ELEVATOR AGREEMENT** 00 30 50

Not Used 🖂

### 00 30 60 GENERAL STATEMENT FOR FM GLOBAL CHECKLIST FOR ROOFING SYSTEMS Not Used

### A. **Related Documents:**

- Section 01 35 16 Alteration Project Procedures;
- 2. Section 07 54 16 PVC Roofing.

### В. **Description of Work:**

- 1. Work Involving FM Global requirements for Existing Roof Removal and Replacement With New Roof:
  - 1.1 The Contractor shall be responsible for adhering to FM Global Checklist Requirements for Roof Removal and Replacement With New Roof. See Section 01 35 16 Alteration Project Procedures and Section 07 54 16 PVC Roofing for additional technical specifications and Contractor responsibilities.
  - 1.2 Refer to the FM Global Data Sheet Website (http://www.fmglobal.com/fmglobalregistration/) and the FM Global Roof Design / Approval Web Tool - RoofNav (https://roofnav.fmglobal.com/RoofNav/Login.aspx).
  - A sample of the FM Global Checklist is located in Division 50 00 00 Project-Specific 1.3 Available Information, 50 60 00 FM Global Checklist For Roofing Systems at the end of the Technical Specification Sections.

### GENERAL STATEMENT FOR "STATEMENT OF SPECIAL INSPECTIONS" 00 30 70

Not Used

A. The "Statement of Special Inspections" for this project is located in Division 50 00 00 Project-Specific Available Information, Section 50 70 00 Statement of Special Inspections at the end of the Technical Specification Sections.

### **GENERAL STATEMENT FOR ADDITIONAL INFORMATION** 00 30 80

Not Used ⊠

**End of Section** 00 30 00 General Statements for Available Information

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(Issued 06-01-18)

Certificate (of Authority)
DAS Construction Services Project No.:
I (Signer's Name) <sup>1</sup> (Signer's Title)
of, an entity lawfully organized and existing under the laws  (Name of Entity)
of, do hereby certify that the following is a true and correct (Name of State or Commonwealth)
copy of a resolution adopted on the day of (Month) <sup>2</sup> , 20 yet by the governing body of (Year) <sup>2</sup>
, in accordance with all of its documents of governance and  (Name Of Entity)
management and the laws of (Name of State or Commonwealth) and further certify that such resolution has not
been modified, rescinded or revoked, and is at present in full force and effect.
RESOLVED: that  (Name of Signer of Contract Documents) (Title of Signer of Contract Do
of is empowered and authorized, on behalf of the entity,  (Name of Entity)
to execute and deliver contracts and amendments thereto, and all documents required by the Governor, the Connecticut
Department of Administrative Services, the Connecticut State Properties Review Board and the Office of the Attorney
General associated with such contracts and amendments.
IN WITNESS WHEREOF, the undersigned has executed this certificate this
(Signature)
(Print Name) (Title)

### **Reference Notes:**

- The signer of this certificate must be someone *other than* the signer of the contract documents *except for* a sole managing member of an LLC or the sole officer or sole principal of a corporation. *If* the signer is a sole managing member of an LLC, *then* along with this certificate the signer must provide a letter on company letterhead that indicates the signer is a sole member and managing member. If the signer is the sole officer or sole principal of a corporation, then the signer must provide with the certificate a letter on company letterhead setting forth this fact.
- 2 This date must be on or before the date of signing of the Bid Proposal (or Contract).
- 3 This person shall sign the Contract and other required documents.
- 4 This date must be on or after the date of signing of the Bid Proposal (or Contract).

### For Your Information:

### **Certificate (of Authority)**

### **All Bidders:**

Complete page 1, print, sign, and scan to PDF. Upload the PDF form to BizNet.

What the **Certificate** is saying is that the organization authorized the signatory to sign the pertinent **documents other than** the Certificate (of Authority) and that, as of the date of **execution** of the CERTIFICATE (i.e., the date set forth in the "In Witness Whereof" blanks) there has been no change in that authorization.

### **Instructions For Completing The Certificate (of Authority)**

### The <u>Certificate (of Authority)</u> to <u>Accompany</u> the <u>Bid Proposal Form</u>:

- 1. 1<sup>st</sup> Paragraph:
  - **1.1** First, enter the name and title of the individual signing the Certificate (of Authority).
  - **1.2** Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
  - 1.3 Third, enter the name of the state or commonwealth the entity is registered in.
  - **1.4** Fourth, enter the date the resolution was adopted by the governing body. This date is on or before the date the <u>Bid Proposal</u> is signed.
  - **1.5** Fifth, enter the name of the state or commonwealth the entity is registered in.
- 2. 2<sup>nd</sup> Paragraph:
  - **2.1** First, enter the name and title of the individual signing bid documents for the entity.
  - 2.2 Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
- 3. Last Paragraph:
  - 3.1 Enter the Witness Date<sup>1</sup>. This date will likely be the date of execution of the Bid Proposal form.

<sup>1</sup> This Witness Date Should Not Be Before The Date Of Execution Of The Bid Proposal.

### The Certificate (of Authority) to Accompany the Contract:

- 1. 1st Paragraph:
  - 1.1 First, enter the name and title of the individual signing the Certificate (of Authority).
  - **1.2** Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
  - 1.3 Third, enter the name of the state or commonwealth the entity is registered in.
  - 1.4 Fourth, enter the date the resolution was adopted by the governing body. This date is on or before the date the Contract is signed.
  - 1.5 Fifth, enter the name of the state or commonwealth the entity is registered in.
- 2. 2<sup>nd</sup> Paragraph:
  - **2.1** First, enter the name and title of the individual signing contract documents for the entity.
  - **2.2** Second, enter the legal name of the entity (exactly as it is shown on the Secretary of State registry).
- 3. Last Paragraph:
  - 3.1 Enter the Witness Date 1. This date will likely be the date of execution of the Contract.

<sup>1</sup> This Witness Date Should Not Be Before The Date Of Execution Of The Contract.

**End of Section 00 40 14 Certificate (of Authority)** 

## State of Connecticut Department of Administrative Services (DAS) Contractor Prequalification Forms

### **IMPORTANT INFORMATION – PLEASE READ**

For Projects with estimated Construction Costs greater than \$500,000

### WHEN YOU SUBMIT A BID YOU MUST INCLUDE WITH YOUR OTHER DOCUMENTS THE FOLLOWING:

1. A copy of your "DAS Contractor Pregualification Certificate".

This document may be found at the DAS Contractor Pregualification Search:

Go to the DAS Homepage (<u>www.ct.gov/DAS</u>), click on "Doing Business with the State", click on "Apply for DAS Construction Contractor Prequalification", click on "How To", and then click on "Search Prequalified Companies".

To search for your company, just type in your company name and click on "Go" to pull up your company. When your company information appears you will notice that your company name is shown as a blue link. Just click on this link and it will take you to your Prequalification Certificate.

### 2. A "DAS Update (Bid) Statement".

This document may be found and completed on-line at the Bid Statement Online Application.

Go to the DAS Homepage (<a href="www.ct.gov/DAS">www.ct.gov/DAS</a>), click on "Doing Business with the State", click on "Apply for DAS Construction Contractor Prequalification", click on "Documents/Forms", click on "Update Bid Statement", and then click on "Bid Statements".

Follow instructions in the "Instructions for Prequalification".

Go to the DAS Homepage (<a href="www.ct.gov/DAS">www.ct.gov/DAS</a>), click on "Doing Business with the State", click on "Apply for DAS Construction Contractor Prequalification", click on "How To", and then click on "View Instructions for Prequalification".

Should you have any questions or concerns, please call (860) 713-5280.



	efhosurement (Rusiness   Fleet Sensions ) Jobs (Human Resource   Resource Directors   News		
	CT Gov Home   Blood DIS   Contact DIS   Press Room   DIS Home   Quick Links   FBQ   Site Mag-		
D/IS NOME	The Department of Administrative Services, <u>Review our Privacy Policy</u> . All State disclaimers and permissions apply.  Need to contact us? Send e-mail to das webmaster@po.state.ot.us		
	Copyright #2001, 2002, 2003, 2004 - Last Updated: Saturday, October 09, 2004		
Get Combat 人	The software to view and print Adobe Acrobat documents (PDF Files) is available free from the Adobe website.  To get a free copy of the software, click the "Get Acrobat" image.		

For information regarding the DAS Contractor Prequalification Program visit the above mentioned website or call (860) 713-5280.

http://www.das.state.ct.us - click on contractor prequalification (under the business section).

### State of Connecticut Department of Administrative Services (DAS) Contractor Prequalification Update Bid Statement

(Statement to be included with the bid)

### Public Act No. 04-141 - AN ACT REVISING PREQUALIFICATION REQUIREMENTS FOR STATE CONSTRUCTION CONTRACTS.

On and after October 1, 2004, each bid submitted for a contract shall include a copy of a prequalification <u>certificate</u> issued by the Commissioner of Administrative Services. The bid shall also be accompanied by an update statement in such form as the Commissioner of Administrative Services prescribes. The form for such update statement shall provide space for information regarding all projects completed by the bidder since the date the bidder's prequalification certificate was issued or renewed, all projects the bidder currently has under contract, including the percentage of work on such projects not completed, the names and qualifications of the personnel who will have supervisory responsibility for the performance of the contract, any significant changes in the bidder's financial position or <u>corporate structure</u> since the date the certificate was issued or renewed, <u>any change in the contractor's qualification status</u> and such other relevant information as the Commissioner of Administrative Services prescribes. Any bid submitted without a copy of the prequalification certificate and an update statement shall be invalid.

Name of Company:					_	
FEIN:	AN FRA					
Company Address:						
Prequalification Contact and Telephone Number						
Date of Prequalification with the DAS:	Single Limit: Agg		Aggreg	Aggregate Work Capacity (AWC):		
* This amount equals your company's AWC min	us the Total \$ Amount of Work I	Remaining.	* Remai	ning Aggregate	e Work Capacity:	
Please list all of your company's (100%) completed projects since date of Prequalification: (Please add additional page(s) if required)  Date Project Total Contract						
Name of Project		Owner of P	roject	Complete		Amount
(Please add additional page(s) if required	d. Please total the Work Re	emaining c	olumn)			
(Please add additional page(s) if required		emaining c		Total Contract Amount	% Comple	Work ete Remaining (\$)
				Contract	, -	ete Remaining
				Contract	, -	ete Remaining

Name of Project that company

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Please list the names and titles of the personnel who will have supervisory responsibility for the performance of the contract being bid on:

Individual Name	ndividual
Have there been	
business organization, which might affect your company's successfully complete this contract?	s ability to
Yes or No	
If yes, please explain:	
l, certify under penalty of law that all of the information contained Statement is true and accurate to the best of my knowledge as of	
Signature	 Date
It is the responsibility of the Awarding Authority to determine if a contractor's performance on this project.	any of the information provided above will impact the

The DAS' Contractor Prequalification Program can be reached at (860) 713-5280

Rev.12.22.2004

### **Bid Proposal Form**

DAS I Construction Services I Office of Legal Affairs, Policy, and Procurement 450 Columbus Boulevard, Suite 1302 I Hartford, CT 06103

Date and Time of Bid Opening:	See page 1 of Section 00 11 16 Invitation To Bid.
Instructions for On-Line Bidding:	Follow the instructions in 6001 Construction On-line Bidding Instructions, available for download from the DAS/CS Library ( <a href="http://portal.ct.gov/DASCSLibrary">http://portal.ct.gov/DASCSLibrary</a> ) > 6000 Series – Bid Phase Forms. For questions, call 860-713-5794 or 860-713-5783.

### **Instructions for Completing This Bid Proposal Form:**

- **Download** and **save** the Bid Proposal Form to your computer. Close the form. Open your *saved* Bid Proposal Form and type required information in blue boxes. (Remember to keep saving to your computer.)
- · On your Word Toolbar, click "View" then "Edit Document" or "Print Layout" in order to edit the form.
- When your Bid Proposal Form is complete, perform a final "save" to your computer! Print ALL pages and sign
  your Bid Proposal Form. Scan ALL pages of your Bid Proposal Form to PDF. Upload the PDF Bid Proposal
  Form to BizNet.
- **Duly Authorized Signature:** A duly authorized representative of the Bidder or Bidder's partnership, firm, corporation or business organization must sign the Bid Proposal Form.
- · No Facsimile Signature is permitted. All information below is to be filled in by the Bidder.
- If an Addendum is issued that **changes** the **Bid Proposal Form** then the **Revised Bid Proposal Form** (issued with the Addendum) **must** be uploaded instead.
- Upload to BizNet only the additional Bid Package Documents as described in Table 1 of Section 00 41 10 Bid Package Submittal Requirements.
- A signed and scanned Certificate (of Authority), Section 00 40 14, must be uploaded to Biznet prior to the date and time of the Bid Opening.
- Any Bid Proposal Form that has omitted or added items, altered the form, contains conditional, alternative, or obscure bids, or is submitted without the signature of the bidder or its authorized representative, will be rejected.
   See Section 00 21 13 Instructions to Bidders for additional information.

	1.0 General Bid Proposal Information:				
Construction Costs:	Greater Than \$500,000				
Bidding Limited To :	Contractors Prequalified by DAS for General Building Construction (Group C)				
Threshold Limits: (C.G.S. §29-276b)	This Project DOES NOT exceed Threshold Limits.				
Set Aside Requirements:	SBE Subcontractors &/or Suppliers: 25%; MBE Subcontractors &/or Suppliers: 6.25%				
Project Title:	Master Plan Phase III Renovations and Additions				
	Norwalk Community College				
Project Location:	118 Richards Avenue				
	Norwalk, CT				
Project Number:	BI-CTC-467				
Pre-Bid Meeting:	See Section 00 11 16 Invitation to Bid and Section 00 25 13 Pre-Bid Meeting.				
Plans and Specifications prepared by A/E:	Mitchell Giurgola Architects, LLP, 630 Ninth Avenue, Suite 711, New York, NY				

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1.1	<b>Commencement and Acceptance:</b> (See Section 00 73 13 General Conditions, Article 4 - Commencement and Progress of Work and Article 1 - Definitions)		
The Se	The Selected Bidder shall commence Work within fourteen (14) Calendar Days after receiving a		
"Cons	"Construction Start Date and Notice to Proceed" by the Commissioner or authorized representative		
and co	nd continue for 545 Calendar Days for "Substantial Completion" of the project;		
and the	en continue 90 Calendar Days for "Acceptance" of the Work.		

Liquidated Damages: (See Section 00 73 13 General Conditions, Article 8 - Damages & Article 1 - Definitions) 1.2.1 **Liquidated Damages – Substantial Completion:** The Selected Bidder shall be assessed \$ 3.394 per Calendar Day beyond the date established for Substantial Completion of the Contract according to the Contract Time as defined in Article 1.28 of Section 00 73 13 General Conditions, and not otherwise excused or waived pursuant to the Contract Documents, as defined in Article 1.23 of Section 00 73 13 General Conditions. 1.2.2 **Liquidated Damages - Acceptance:** per Calendar Day beyond ninety (90) days after the date of The Selected Bidder shall be assessed \$ 3.094 said Substantial Completion that the Selected Bidder fails to achieve Acceptance, as defined in Article 1.1 of Section 00 73 13

1.3 Bid Proposal Statements and Conditions: This Bid Proposal Form shall be submitted according to, and in compliance with, the foregoing and following statements, conditions, and/or information:

General Conditions and not otherwise excused or waived as described above.

- 1.3.1 This Bid Proposal Form is submitted in accordance with Chapter 60 Construction And Alterations Of State Buildings, Part II Bidding And Contracts of the Connecticut General Statutes (C.G.S.), as amended, particularly C.G.S. § 4b-91(a)(5)(A) - (C), and pursuant to, and in compliance with, the **Invitation to Bid** (Section 00 11 16), the **Instructions to Bidders** (Section 00 21 13), the Bid Package Submittal Requirements (Section 00 41 10), and the Contract (Section 00 52 03).
- 1.3.2 The Bidder proposes to furnish the labor and/or materials, installed as required for the Project named and numbered on this Bid Proposal Form, submitted herein, furnishing all necessary equipment, machinery, tools, labor and other means of construction, and all materials specified in the manner and at the time prescribed strictly in accordance with the provisions of the Contract including, but not limited to, the specifications and/or drawings together with all Addenda issued by the Awarding Authority and received by the Bidder, prior to the scheduled Date and Time of the Bid Opening as stated on page 1 of the Invitation To Bid, and in conformity with requirements of the Awarding Authority and any laws or Departmental regulations of the State of Connecticut or of the United States which may affect the same, for and in consideration of the price(s) stated on this **Bid Proposal Form**, hereof.
- 1.3.3 The Bidder acknowledges that the Proposed Lump Sum Base Bid submitted on this Bid Proposal Form includes all work indicated on the drawings and/or described in the specifications, except for the Contingent Work described in Subsection 2.4.
- 1.3.4 The Bidder acknowledges and agrees to furnish all labor and materials required for this **Project**, in accordance with the accompanying Plans and Specifications prepared by the Architect/Engineer listed on page 1 of this Bid Proposal Form, for the Contract Sum specified in the Proposed Lump Sum Base Bid in Subsection 2.1 of this Bid Proposal Form, subject to additions and deductions according to the terms of the specifications, and including the number of Addenda stated in Subsection 2.2 of this Bid Proposal Form.

### 1.4 Award:

1.2

- 1.4.1 All Bid Proposals shall be subject to the provisions of Section 00 21 13 Instructions to Bidders and for purpose of award, consideration shall be given only to Bid Proposals submitted by qualified and responsible Bidders.
- The award shall be made on the lowest Lump Sum Bid and any or all Supplemental Bid(s) as stated in Subsection 2.4.2 of this Bid Proposal Form, taken sequentially, as applicable, provided funds are available.
- In the event of any discrepancy between the amount written in words and the amount written in numerical figures, the 1.4.4 amount written in words shall be controlling.

2.0 Bid Proposal Requirements:				
		Bidder Information:		
	Bid Uploaded On:	(Month) (Day) (Year)		
	Proposal Of:	(Complete Bidder's Legal Company Name As Registered With the CT Secret	ary of State)	
	Firm Address:	(Avenue / Street) (Town / City) (State		
	Contact Person:	(Name) (Title		
Co	ntact Information:	(Phone Number) (Fax Number) (Email Add		
T	Threshold Project:	Major Contractor Registration License No.:	21000)	
		All Bidders for Projects that exceed Threshold Limits (see page 1 of Form): Insert your Firm's Major Contractor Registration License Norwided above. NOTE: If this Project does NOT exceed Threshold Applicable" in the blue box above. Delete this note by pressing the specific page 1 of 1 o	umber in the space Limits, insert "Not	
2.1	Proposed Lump S	um Base Bid:		
2.1.1	and "printed words"	Proposed Lump Sum Base Bid in the spaces provided below, including to dollar amount. The Proposed Lump Sum Base Bid shall include all gs and/or described in the specifications except for Contingent Work.		
2.1.2		Sum Base Bid shall be shown in <u>both</u> numerical figures and "printed variation repancy the "printed" words dollar amount shall govern.	vords" dollar amount.	
2.1.3	The Proposed Lump S	Sum Base Bid is:		
	\$			
		(Place <u>Numerical Figures</u> in the Box Above)	l	
		(Insert "Printed Words" Dollar Amount in the Box Above)	Dollars	
2.2	Number of Adden	· · · · · · · · · · · · · · · · · · ·		
2.2.1		Number of Addenda issued by the State of Connecticut in the space pro	vided below.	
2.2.2		the <u>correct number</u> of all <b>Addenda</b> in <u>the box below</u> in this <b>Bid Prop</b>		
2.2.3		nes that their Proposed Lump Sum Base Bid Proposal includes:  nber of Addenda. If none, enter "0".		
2.3	Allowances:			
See Se	ection 01 20 00 Contract	Considerations in Division 01 General Requirements for Allowances for a	onlicability	

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### 2.4 Contingent Work:

2.4.1 Base Bid Quantities and Defined Unit Prices: See Section 01 20 00 Contract Considerations in Division 01 General Requirements for applicability regarding Base Bid Quantities and Defined Unit Prices for Earth and Rock Excavation, Miscellaneous Items, Alterations Items, Environmental Remediation, and/or Hazardous Building Materials Abatement.

### 2.4.2 Supplemental Bids:

- .1 See Section 01 23 13 Supplemental Bids in Division 01 General Requirements for applicability.
- .2 All Bidders: If Supplemental Bids are applicable to this Project, insert the Supplemental Bids in the spaces provided below. Any Supplemental Bids listed below, if accepted by the Owner, will be taken cumulatively and in numerical order as scheduled. No Supplemental Bid will be skipped or taken out of numerical order as scheduled.

Supplemental Bid No. 1: Enter information in blue boxes below:							
ADD: \$	Dollars						
(Insert Numerical Figures) (Insert "Printed Words" Dollar Amount)							
Supplemental Bid No. 2: Enter information in blue boxes below:	Supplemental Bid No. 2: Enter information in blue boxes below:						
ADD: \$	Dollars						
(Insert Numerical Figures) (Insert "Printed Words" Dollar Amount)							
Supplemental Bid No. 3: NOT APPLICABLE							
ADD: \$	Dollars						
(Insert Numerical Figures) (Insert "Printed Words" Dollar Amount)							
Supplemental Bid No. 4: NOT APPLICABLE							
ADD: \$	Dollars						
(Insert Numerical Figures) (Insert "Printed Words" Dollar Amount)							

### 2.5 Bidder's Qualification Statement and Objective Criteria for Evaluating Bidders:

- 2.5.1 All Bidders: Download Section 00 45 14 General Contractor Bidder's Qualification Statement from BizNet for a template and instructions. Complete and upload Section 00 45 14 General Contractor Bidder's Qualification Statement to Biznet prior to the date and time of the Bid Opening. Information with regards to the General Contractor's Bidder's Qualification Statement is submitted and is made part of this Bid Proposal Form. Failure of a Bidder to answer any question or provide required information shall be grounds for the awarding authority to disqualify and reject the bid, pursuant to Connecticut General Statutes §4b-92.
- 2.5.2 All Bidders shall comply with Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders. Note: Individual Specification Sections may contain General Contractor and/or Subcontractor Qualification requirements that exceed those in Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders.

### 2.6 Bidder's Prequalification Requirements for Projects Exceeding \$500,000:

All Bidders for Projects with estimated Construction Costs <u>greater</u> than \$500,000: Upload to BizNet a current copy of your Firm's "DAS Contractor Prequalification Certificate" and "Update (Bid) Statement" for the applicable Class of Work on page 1 of this Bid Proposal Form *prior* to the date and time of the Bid Opening. Failure to comply with this requirement shall cause rejection of the bid and shall not be considered a minor irregularity under C.G.S. § 4b-95. See Section 00 40 15 CT DAS Prequalification Forms for instructions on preparing and/or downloading your Firm's "DAS Contractor Prequalification Certificate" and "DAS Update (Bid) Statement".

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### 2.7 Named Subcontractors and Classes of Work:

2.7.1 All Bidders for Projects with one or more Classes of Work checked in Table 2.7 below: Complete Table 2.7 according to the instructions below. Failure to properly provide all of the required information in Table 2.7 may cause rejection of the bid.

	Table 2.7: Named Subcontractors and Classes of Work:
$\boxtimes$	Electrical Work: Enter information in blue boxes below:
	Complete Subcontractor Name:
	Proposed Dollar Value of Subcontract: \$
$\boxtimes$	HVAC Work: Enter information in blue boxes below:
	Complete Subcontractor Name:
	Proposed Dollar Value of Subcontract: \$
$\boxtimes$	Masonry Work: Enter information in blue boxes below:
	Complete Subcontractor Name:
	Proposed Dollar Value of Subcontract: \$
$\boxtimes$	Plumbing Work: Enter information in blue boxes below:
	Complete Subcontractor Name:
	Proposed Dollar Value of Subcontract: \$
	Environmental Remediation: NOT APPLICABLE
	Complete Subcontractor Name:
	Proposed Dollar Value of Subcontract: \$
$\boxtimes$	Hazardous Materials Abatement: Enter information in blue boxes below:
	Complete Subcontractor Name:
	Proposed Dollar Value of Subcontract: \$
2.7.2	2 Instructions For Table 2.7:
.1	Each Class of Work set forth in a separate section of the specifications pursuant to this Section shall be a subtrade designated in Table 2.7 of this Bid Proposal Form and shall be the matter of a subcontract.
.2	When a box is checked in <b>Table 2.7</b> , the Bidder shall insert the name of the Subcontractor with the <b>largest</b> proposed
	Subcontract Value; this is known as the "Named Subcontractor". The Bidder shall provide <u>all</u> of the information for each <u>checked</u> Class of Work.
.3	
.4	For each Class of Work specified in Table 2.7, the Bidder shall list the Subcontractor with the <i>largest</i> Proposed Dollar Value of Subcontract for each Class of Work as the Named Subcontractor and the Proposed Dollar Value of its Subcontract. If the Bidder intends to use more than one Subcontractor to perform a Class of Work, then it shall indicate the Subcontractor Name and Subcontract Value for the <i>largest</i> single Named Subcontractor.
.5	If a Bidder customarily performs any of the specified Classes of Work and is Prequalified by DAS for the Class of Work at the time of the Bid Opening Date if the work is greater than \$500,000, the Bidder may list itself as a Subcontractor together with its price in the space provided in Table 2.7. Failure to properly provide all of the required information in Table 2.7 shall cause rejection of the bid.
.6	
.7	In the event the Bidder either lists itself or is presumed to perform with its own employees all work in a specified class, no such sub-bid by a Bidder shall be considered unless the Bidder can show to the satisfaction of the awarding authority, based on objective criteria established for such purpose, that it customarily performs such subtrade work and is qualified to do the character of work required by the applicable section of the specifications.

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- 2.8 Set Aside Requirements: (see Section 00 73 38 "CHRO Contract Compliance Regulations") 2.8.1 All SBE/MBE Bidders: Submit a current copy of your Firm's "DAS Set-Aside Certificate" with your Bid Proposal Form prior to the date and time of the Bid Opening. For Projects Less Than \$500,000: Upload a completed copy of the CHRO Employment Information Form, "Bidder 2.8.2 Contract Compliance Monitoring Report" with your Bid Proposal Form prior to the date and time of the Bid Opening. The report is on the CHRO Webpage (http://www.ct.gov/chro/cwp/view.asp?a=2525&Q=315900&chroPNavCtr=I#45679). All Bidders shall be required to award not less than the percentage(s) stated on page 1 of this Bid Proposal Form to Subcontractors who are currently certified and eligible to participate under the State of Connecticut Set-Aside Program for SBE and/or MBE contractors, in accordance with C.G.S.§ 4a-60g. Failure to meet these requirements shall cause rejection of the bid. 2.9 Insurance Coverages: The limits of liability for the Insurance required for this project shall be those listed in Article 35 Contractors Insurance of Section 00 73 13 General Conditions. Also see Section 00 62 16 Certificate of Insurance. **Special Hazards Insurance:** 2.9.1 П None is Required. "X-C-U" Coverage (explosion, collapse, and underground damage) shall be required in accordance with Article 35 Contractors Insurance of Section 00 73 13 General Conditions.
- 2.9.2 Builders Risk Insurance:

None is Required.

 $\boxtimes$ 

The Bidder shall be required to maintain Builder's Risk Insurance providing coverage for the entire Work at the project site, portions of the Work located away from the site but intended for use at the site, and portions of the Work in transit. Coverage shall be written on an All-Risk, Replacement Cost, and completed Value Form basis in an amount at least equal to the projected completed value of the Work and the policy shall state that the State of Connecticut shall be named as a loss payee not as an additional insured for these coverages.

### 2.9.3 Commercial General Liability Insurance:

<u>NOTE:</u> There is a new requirement regarding **commercial general liability (CGL) insurance:** All selected firms are required to provide an endorsement to the CGL insurance stating that the State of Connecticut is an additional insured. Please be advised that a blanket endorsement <u>may not</u> be acceptable.

### 2.9.4 Owners and Contractors Protective Liability Insurance:

Asbestos Abatement Insurance is required.

The Bidder shall maintain **Owner's and Contractor's Protective Liability** insurance providing a total limit of \$1,000,000 for all damages arising out of bodily injury or death of persons in any one accident or occurrence and for all damages arising out of injury or destruction of property in any one accident or occurrence and subject to a total (aggregate) limit of \$2,000,000 for all damages arising out of bodily injury to or death of persons in all accidents or occurrences and out of injury to or destruction of property during the policy period. This coverage shall be for and in the name of the State of Connecticut.

### 2.9.5 Umbrella Liability Insurance:

This project requires **Umbrella Liability Insurance**. The Bidder shall provide an endorsement to the Umbrella Liability Insurance stating that the State of Connecticut is an additional insured. Select the correct **Umbrella Limit** for this **Project's Contract Value** using the "Umbrella Liability Insurance Table" below.

Umbrella Liability Insurance Table:							
C	Contract Value	9	Umbrella Limit				
\$1.00	to	\$500,000.00	\$1,000,000.00				
\$500,000.01	to	\$1,000,000.00	\$2,000,000.00				
\$1,000,000.01	to	\$10,000,000	\$5,000,000.00				
\$10,000,000.01	to	\$30,000,000	\$10,000,000.00				
\$30,000,000.01	to	\$80,000,000	\$15,000,000.00				
\$80,000,000.01	to	\$150,000,000	\$20,000,000.00				
\$150,000,000.01	to	\$300,000,000	\$25,000,000.00				

### 3.0 Bid Proposal Acknowledgements:

The Bidder acknowledges and agrees to the following:

- To Upload to BizNet Submit the Bid Proposal Form (all pages), All Other Bid Documents, Affidavits, and Certifications:
- 3.1.1 The Bidder acknowledges and agrees to electronically upload to DAS BizNet <u>all pages</u> of the <u>Bid Proposal Form</u>, All Other Bid Documents, Affidavits, and Certifications, as stated in as stated in <u>Section 00 21 13 Instructions to Bidders</u> and <u>Section 00 41 10 Bid Package Submittal Requirements</u>.
- Failure to upload any of the items marked with an asterisk (\*) in **Table 1** of **Section 00 41 10 Bid Package Submittal Requirements** *shall* cause rejection of the bid and *shall not* be considered a minor irregularity under **C.G.S.** § **4b-95**.
- 3.1.3 If there are any delays in the receipt of other documents then the Bid shall remain valid for the same additional number of days. For example, if the documents are submitted four (4) Calendar Days later; then the bid shall remain valid for ninety-four (94) Calendar Days.
- **3.1.4** Failure to submit the documents before the stated deadline **may** result in rejection of the bid at the sole discretion of the Commissioner of Administrative Services.

### 3.2 To Hold Bid Price:

The Bidder acknowledges and agrees to hold the **Proposed Lump Sum Base Bid** in **Subsection 2.1** of this Bid Proposal Form for **ninety (90) Calendar Days** and any extensions caused by the Bidder's delays in required submissions. The Bidder and the State may mutually agree to extend this period. The agreement to extend the **ninety (90) Calendar Day** period may occur after the expiration of the original **ninety (90) Calendar Day** period.

### 3.3 To Use and Accept Allowances:

When applicable to this Project, the Bidder acknowledges and agrees to accept and use the Allowances as shown in Section 01 20 00 Contract Considerations of Division 01 General Requirements as part of the Proposed Lump Sum Base Bid listed in Subsection 2.1 of this Bid Proposal Form.

### 3.4 To Use and Accept the Following Contingent Work:

- **3.4.1 Unit Prices:** When applicable to this Project, the Bidder **acknowledges and agrees** to accept and use the **Units, Add Unit Prices, and Deduct Unit Prices** as shown in **Section 01 20 00 Contract Considerations** of Division 01 General Requirements in evaluating either additions to or deductions from the Work.
- 3.4.2 Supplemental Bid: When applicable to this Project and if accepted by the Owner, the Bidder acknowledges and agrees to provide all labor, material and equipment to complete the Work in accordance with the Supplemental Bid described in Section 01 23 13 Supplemental Bids of Division 01 General Requirements and provided by the Bidder in Subsection 2.4.2 of this Bid Proposal Form.

### 3.5 To Use the Named Subcontractors Listed in Table 2.7:

The Bidder <u>agrees</u> that each of the **Named Subcontractors** stated in **Table 2.7** of this Bid Proposal Form will be used for the **Class of Work** indicated, for **the Proposed Total Subcontract Value dollar amount stated**, <u>unless</u> a **substitution** is permitted by the awarding authority as provided for in and in accordance with C.G.S. § 4b-96, as amended.

### 3.6 To Make Good Faith Efforts to Employ MBEs:

The Bidder acknowledges and agrees to make **good faith efforts** to employ **Minority Business Enterprises (MBEs)** as **Subcontractors** and **Suppliers** of materials under such Contract.

### 3.7 To Submit a Certified Check or Bid Bond (if required):

The Bidder acknowledges and agrees to submit a **Certified Check** or **Standard Bid Bond** *prior* to the due date and time of the Bid Opening (if required). Download **Section 00 43 16 Standard Bid Bond** from BizNet for a template and instructions.

### 3.8 To Accept the Current Prevailing Wage Rate Schedule:

The U. S. Secretary of Labor's latest decision and the State of Connecticut Department of Labor (DOL) Prevailing Wage Rate Schedule are all incorporated in the documents. The higher rate (Federal or State) for any given occupation shall prevail. At the time of bidding, the Bidder agrees to accept the current Prevailing Wage Rate Schedule, as well as the annual adjustment to the prevailing wage rate that is in effect each July 1st, as provided by DOL. See Section 00 73 44 Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification. Annual adjustments of prevailing wage rates will not be considered a matter for a contract amendment with DAS/CS.

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### 3.0 Bid Proposal Acknowledgements (continued):

### 3.9 To Comply With CHRO Requirements:

If applicable, the Apparent Low Bidder acknowledges and agrees to provide the Commission on Human Rights and Opportunities with such information as is requested by the Commission concerning their **employment practices and procedures** as they relate to the current provisions of the Connecticut General Statutes governing Contract requirements within **fifteen (15) calendar days** *after* receipt of the "Request for the *Affirmative Action Plan* and *Employment Information Form* Letter" from the DAS/CS Office of Legal Affairs, Policy, and Procurement.

### 3.10 To Ensure Executive Order No. 11246 for Equal Employment Opportunity & Non-Segregated Facilities Has Been Met:

The Apparent Low Bidder acknowledges and agrees to ensure that Executive Order No. 11246 for Equal Employment Opportunity & Non-Segregated Facilities has been met for their firm and their Subcontractors. The Apparent Low Bidder also agrees to certify (if required) to the compliance of non-segregated facilities.

### 3.11 To Obtain and Maintain Required Insurance Coverages:

The Bidder acknowledges and agrees to obtain and maintain the required Insurance Coverages and submit the Firm's "Certificate of Liability Insurance Acord® form" within ten (10) business days *after* receipt of the "Letter of Intent" from the DAS/CS Office of Legal Affairs, Policy, and Procurement, as discussed in Section 00 62 16 Certificate of Insurance and Article 35, "Contractors Insurance" in Section 00 73 13 General Conditions.

### 3.12 To Comply With Security Requirements for CT Department of Correction Facilities:

When applicable to this Project, the Bidder acknowledges and agrees to comply with Section 00 73 63 CT Department of Correction (CT DOC) Security Requirements for Contract Forces on CT DOC Facilities.

### 3.13 To Ensure C.G.S. § 12-430 for Non-Resident Contractors Has Been Met:

If applicable, the Apparent Low Bidder acknowledges and agrees to provide either a copy of the "Notice of Verified Status" (Verification Letter) from the Connecticut Department of Revenue Services (DRS) (for Verified Nonresident General/Prime Contractors) or a copy of Form AU-965 "Acceptance of Surety Bond" from DRS (for Unverified Nonresident General/Prime Contractors) within ten (10) business days after receipt of the "Letter of Intent" from the DAS/CS Office of Legal Affairs, Policy, and Procurement which evidences that C.G.S. § 12-430 for non-resident contractors has been met, as described in Section 00 92 30 Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors.

### 3.14 To Execute Contract:

If selected as the Prime Contractor, the Bidder acknowledges and agrees to **execute a Contract** in accordance with the terms of this **Bid Proposal Form** and the **Contract** within **fifteen (15) Calendar Days** (legal State holidays excluded) **after** notification thereof by the awarding authority. See **Section 00 52 03 Contract** for a sample.

### 4.0 Confidentiality of Documents:

- **4.1** The **undersigned** agrees that if not selected as the Prime Contractor for this project, all plans and specifications in their possession for the project shall be destroyed.
- **4.2** The **undersigned** agrees that if selected as the Prime Contractor for this project:
- **4.2.1** The plans and specifications shall not be disseminated to anyone except for construction of this project.
- **4.2.2** The **following provision** shall be included in all of its contracts with subcontractors and sub-consultants:

"Any and all drawings, specifications, maps, reports, records or other documents associated with the contract shall only be utilized to the extent necessary for the performance of the work and duties under this contract. Said drawings, specifications, maps, reports, records and other documents may not be released to any other entity or person except for the sole purpose of the work described in this contract. No other disclosure shall be permitted without the prior written consent of DAS Construction Services. When any such drawings, specifications, maps, reports, records or other documents are no longer needed, they shall be destroyed."

**4.2.3** Upon completion of the construction and the issuance of a certificate of occupancy, the plans and specifications shall be returned to DAS Construction Services, or destroyed, or retained in a secure location and not released to anyone without first obtaining the permission of DAS Construction Services.

### 5.0 Bid Proposal Declarations:

I (we), the undersigned, hereby declare that I am (we are) the only person(s) interested in the Bid Proposal and that it is made without any connection with any other person making any Bid Proposal for the same work. No person acting for, or employed by, the State of Connecticut is directly or indirectly interested in this Bid Proposal, or in any Contract which may be made under it, or in expected profits to arise therefrom. This Bid Proposal is made without directly or indirectly influencing or attempting to influence any other person or corporation to bid or refrain from bidding or to influence the amount of the Bid Proposal of any other person or corporation. This Bid Proposal is made in good faith without collusion or connection with any other person bidding for the same work and this proposal is made with distinct reference and relation to the plans and specifications prepared for this Contract. I (we) further declare that in regard to the conditions affecting the Work to be done and the labor and materials needed, this Bid Proposal is based solely on my (our) own investigation and research and not in reliance upon any representations of any employee, officer or agent of the State.

6.0 Duly Authorized Signature:						
Type of Business: (	(Check Applicable Box)					
☐ Limited Liabilit	y Corporation (LLC)		Corporation	n (If Checked, Provide Co	orporate Seal Below)	
☐ Partnership						
☐ Sole Proprieto	or					
☐ Doing Busines	ss As (d/b/a)					
(If d/b/a box is che	cked provide complete name	e below) (Pro	(Provide exact corporate name from corporate seal below)			
(Do	ing Business As Name)		(Name On Corporate Seal)			
Signed:						
	(Month)	(Day)	_	(Year)		
Bidder's Signature:						
	(Duly Author	rized)		(Title)		
	(Print Nam	ed)		(Date)		

### **Bid Package Submittal Requirements:**

DAS I Construction Services I Office of Legal Affairs, Policy, and Procurement 450 Columbus Boulevard, Suite 1302 I Hartford, CT 06103

## 1.1.1 On-Line Bidding: 1.1.1 All Bidders shall electronically upload their Bid Package Documents to BizNet following the instructions in the DAS/CS publication, 6001 Construction On-line Bidding Instructions, available for download here: Go to the DAS Homepage (<a href="https://www.ct.gov/DAS">www.ct.gov/DAS</a>) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 6000 Series > 6001 Construction On Line Bidding Instructions. 1.1.2 For questions, call 860-713-5794.

### 1.2 Bid Package Submittal Requirements:

All Bidders are required to **electronically upload Bid Package Documents** to BizNet *prior* to the date and time of the Bid Opening. Additional documents must be either **electronically uploaded** to BizNet **or** submitted as **paper copies** to the **appropriate Agency**. See Tables 1, 2, and 3 for specific submittal requirements.

- 1.2.1 All Bidders: See Table 1. All Documents in Table 1 must be electronically uploaded to BizNet.
- **1.2.2** Three (3) Apparent Lowest Bidders: See Table 2.
- **1.2.3** Apparent Low Bidder: See Table 3.

### 1.3 Deadlines for Receipt of Bid Package Documents:

- **Table 1:** Bid Package Documents must be uploaded to BizNet *prior* to the date and time of the Bid Opening. Failure to upload to BizNet any of the items **marked with an asterisk (\*)** prior to the Bid Opening **shall** cause rejection of the bid and shall not be considered a minor irregularity under Connecticut General Statutes (C.G.S.)
- **1.3.2 Tables 2 and 3:** See the tables for additional deadlines. Failure to submit the documents before the stated deadlines **may** result in rejection of the bid at the sole discretion of the Commissioner of Administrative Services.

### 1.4 Delays in Receipt of Supportive Documents from the Three Apparent Lowest Bidders:

- **1.4.1** If there are any delays in the receipt of the supportive documents specified in Tables 2 and 3, then the Bids shall remain valid for the same additional number of days.
  - .1 For example, since the Three (3) Apparent Lowest Bidders are required to Hold The Bid Price for ninety (90) calendar days, if supportive documents are submitted four (4) calendar days later, then the bid shall remain valid for ninety-four (94) calendar days.
- **1.4.2** Failure to submit the documents before the stated deadline **may** result in rejection of the bid at the sole discretion of the Commissioner of Administrative Services.

	TABLE 1 ALL BIDDERS				
Construction Costs:  Less Than Greater Than \$500,000		The Bid Proposal Form, Other Bid Package Documents, Affidavits, and Certifications shall be electronically uploaded to BizNet by all Bidders prior to the Date and Time of the Bid Opening.	Form Location		
	В	id Proposal Form and Other Bid Package Documents			
$\boxtimes$	$\boxtimes$	* Section 00 41 00 Bid Proposal Form	BizNet		
$\boxtimes$	$\boxtimes$	* Section 00 43 16 Standard Bid Bond or Certified Check	BizNet		
$\boxtimes$	$\boxtimes$	* Section 00 45 14 General Contractor Bidder's Qualification Statement	BizNet		
	$\boxtimes$	* DAS Prequalification Certificate	BizNet		
	* DAS Update (Bid) Statement BizNet				
$\boxtimes$		Section 00 40 14 Certificate (of authority)	BizNet		
$\boxtimes$		DAS Set-Aside Certificate	BizNet		
		Bidder Contract Compliance Monitoring Report	CHRO Website		
		Affidavits and Certifications			
$\boxtimes$		* Gift and Campaign Contribution Certification – OPM Ethics Form 1	BizNet		
$\boxtimes$	$\boxtimes$	* Consulting Agreement Affidavit – OPM Ethics Form 5	BizNet		
$\boxtimes$		* Ethics Affidavit (Regarding State Ethics) – OPM Ethics Form 6	BizNet		
	$\boxtimes$	* Iran Certification – OPM Ethics Form 7	BizNet		
	$\boxtimes$	Nondiscrimination Certification – Form A, B, C, D, or E	BizNet		

<sup>\*</sup> **NOTE:** Failure to electronically upload any of the items marked above with an asterisk (\*) prior to the date and time of the Bid Opening **shall** cause rejection of the bid and shall not be considered a minor irregularity under CGS 4b-95.

TABLE 2 THREE (3) APPARENT LOWEST BIDDERS						
Construc	tion Costs:	WHEN APPLICABLE:				
Less Than		Submit within ten (10) Calendar Days after receipt of the "Set-Aside Contractor Schedule Request" from the DAS/CS Procurement Unit:	Form Location			
	$\boxtimes$	Set-Aside Contractor Schedule for each subcontracted SBE and/or MBE firm(s) (See Section 00 73 27 Set-Aside Contractor Schedule for a sample Request.)	Email From DAS/CS Procurement Unit			
	$\boxtimes$	DAS Set-Aside Certificate(s) for each subcontracted SBE and/or MBE firm(s) listed in the Set-Aside Contractor Schedule.	Download from BizNet			
	$\boxtimes$	Section 00 45 17 Named Subcontractor Bidder's Qualification Statements for each Named Subcontractor listed in the Bid Proposal Form.	Copy from Project Manual			
	$\boxtimes$	DAS Prequalification Certificate(s) and Update (Bid) Statement(s) for each Named Subcontractor listed in the Bid Proposal Form with Subcontracts greater than \$500,000.	Download from BizNet			

TABLE 3 APPARENT LOW BIDDER						
Construc	tion Costs:					
Less Than \$500,000						
Submit with	nin <b>fifteen (15) ca</b>	lendar days after receipt of the "Request for the Affirmative Action Plan a Information Form Letter" from the DAS/CS Procurement Unit:	and <i>Employment</i>			
$\boxtimes$	$\boxtimes$	If Contractor has 50 or more employees and/or the Project is equal to or greater than \$500,000, submit to CHRO: Affirmative Action Plan and Employment Information Form (DAS-45).	CHRO Website & BizNet			
$\boxtimes$	(copy of transmittal letter)					
$\boxtimes$	$\boxtimes$	Submit to CT Department of Labor: Contractors Wage Certification Form. See Section 00 73 44 Prevailing Wage Rates/Contractor's Wage Certification/Payroll Certification.	Copy from Project Manual			

### TABLE 3 APPARENT LOW BIDDER (continued) **Construction Costs:** Submit within ten (10) business days after receipt of the "Letter of **Form Location Less Than Greater Than** Intent" from the DAS/CS Procurement Unit: \$500.000 \$500.000 **Email From DAS/CS** $\boxtimes$ $\bowtie$ Section 00 40 14 Certificate (of authority) **Procurement Unit Email From DAS/CS** $\square$ $\boxtimes$ Section 00 52 03 Contract **Procurement Unit Email From DAS/CS** $\times$ Section 00 52 73 Subcontract Agreement Form (Named & Listed) **Procurement Unit** Certificate of Liability Insurance Acord® form **Email From DAS/CS** $\boxtimes$ $\boxtimes$ **Procurement Unit** (See Section 00 62 16 Insurance Certificate Form for details) Certificate of Asbestos Abatement Liability Insurance (for asbestos abatement only) **Email From DAS/CS** $\boxtimes$ $\times$ **Procurement Unit** (See Section 00 62 16.1 Asbestos Abatement Liability Insurance for details) X $\boxtimes$ **Performance Bond Labor & Material Bond** Section 00 92 10: **Email From DAS/CS Additional Forms Surety Sheet Procurement Unit Bidder's Certification: Financial Position &** $\mathbb{X}$ **Corporate Structure Surety Company Power of Attorney from the Surety Company** Nonresident (Out of State) Contractors: Verified Nonresident General/Prime Contractors must submit a copy of their "Notice of Verified Status" (Verification Letter) from the CT Department of Revenue Services (DRS). CT Department of $\square$ $\boxtimes$ Unverified Nonresident General/Prime Contractors must submit a copy **Revenue Services** of Form AU-965 "Acceptance of Surety Bond" from the DRS. (See Section 00 92 30 Procedures Regarding Taxation for Nonresident General/Prime Contractor and Subcontractors for additional details.) General Permit for the Discharge of Stormwater and **Dewatering Wastewaters from Construction Activities:** For projects disturbing one or more total acres of land area, submit a DAS/CS $\boxtimes$ Xcopy of the signed Stormwater Pollution Control Plan "Contractor Architect/Engineer Certification Statement" and License Transfer Form, as directed by the DAS/CS Architect/Engineer, prior to commencement of any construction activities. Ethics Affidavit (Regarding State Ethics) OPM Ethics Form 6 for $\boxtimes$ **BizNet** each Named Subcontractor CT Department of Threshold Projects Only: Submit Major Contractor Registration $\boxtimes$ $\times$ Consumer License Number(s) for Subcontractors Protection X X **SEEC Website** SEEC Form 10 Secretary of the $\boxtimes$ Certificate of Legal Existence from Corporations State

End of Section
00 41 10 Bid Package Submittal Requirements

PAGE 1 OF 1

	INSTRUCTIONS FOR CERTIFIED CHECK OR BID BOND (select one):							
	All Bidders:							
	Edit this page, print, sign, and scan to PDF. Upload the PDF form to BizNet.							
	CERTIFIED CHECK OPTION: Prior to the Date and Time of the Bid Opening:							
	(1) Check the box for "Certified Check Option";							
	(2) Print, scan to PDF, and upload the PDF form to Biznet; and							
	(3) Deliver the Certified Check, made payable to "Treasurer, State of Connecticut", to the following address:							
	State of Connecticut							
	Department of Administrative Services, Construction Services							
	Office of Legal Affairs, Policy, and Procurement							
	450 Columbus Boulevard, North Tower, Suite 1302 Hartford, CT 06103-1835							
<u> </u>	'							
ΙШ	BID BOND OPTION (see template below): Prior to the Date and Time of the Bid Opening:							
	(1) Check the box for "Bid Bond Option";							
	(2) Complete the <b>Standard Bid Bond</b> (below), print, sign, scan to PDF, and upload the PDF Bid Bond to Biznet.							

### **Standard Bid Bond**

### DAS ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

KNOW ALL MEN BY THESE PRESENTS, That we,									]
				, he	reina	fter ca	lled ti	ne Principal,	
of				, as	Princ	ipal,			
and								,hereinafte	r
called the Surety, a corporation organized and existi	ng ur	der the la	ws of	the					
State of				, and	duly	autho	rized	to transact a	ì
surety business in the State of Connecticut, as Sure	ty, are	held and	l firml	y bou	nd ur	ito the	State	of	
Connecticut, as Obligee, in the penal sum of ten (10)	perc	ent of the	amou	ınt of	the b	id set f	orth i	n a	
proposal hereinafter mentioned,									]
									],
lawful money of the United States of America, for the the Principal and the Surety bind themselves, their I									
jointly and severally, firmly by these presents.	iens,	executor	s, aun	ııııısı	alors	s, succ	<b>C</b> 330	s and assign	113,
THE CONDITION OF THIS OBLIGATION IS SUCH, The						ıbmitte	ed		ı
or is about to submit a proposal to the Obligee relate				-					İ
NOW, THEREFORE, if the said contract be awarded to may be specified, enter into the said contract in wr									
bonds, with surety acceptable to the Obligee, or if	the	Principal	shall	fail to	do :	so, pa	y to t	he Obligee	the
damages which the Obligee may suffer by reason of this obligation shall be void, otherwise to remain in f				ceedir	ng the	penal	ty of	this bond, th	ıen
SIGNED, SEALED AND DELIVERED this		day of				1 , 20			7
GIGHED, GEALED AND DELIVERED UNG		l aay or							_
(Principal's Signature)	İ				Sı	ırety			J
(	by								7
(Print Name)	, -	<u> </u>	lts a	ttorne	y in f	fact Sig	gnatu	re	_
									]
Company Name				(	Print I	Vame)			

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### **General Contractor Bidder's Qualification Statement**

DAS ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

### Instructions:

- All Bidders are required to upload this form to BizNet, properly completed, prior to the date and time of the Bid Opening.
- Failure of a Bidder to answer any question or provide required information shall be grounds for the awarding authority to disqualify and reject the bid, pursuant to Connecticut General Statutes §4b-92.
- If a question or request for information does not pertain to your organization in any way, use the symbol "NA" (Not Applicable).
- Attach additional information on 8 1/2" x 11" sheets with your letterhead as necessary and reference specific section and subsection numbers.
- NOTE: The Department reserves the right to request any additional or supplemental information

	necessary to complete its evaluation of a Bidder's qualification.								
1.0	Proj	ect Information:							
	1.1	DAS/CS Project Number:							
	1.2	Project Name:							
	1.3	Project Location:							
2.0	Proj	ects with Construction Costs Estimated T	о Ве	Greater than \$	500,000:				
	. 8	Select the applicable Class of Work as stated	d in tl	ne <b>00 11 16 Invit</b>	ation to Bid.				
		Select <b>YES</b> if your Firm has the applicable the <b>Update (Bid) Statement</b> or <b>NO</b> if it does not.	<b>DA</b>	S Prequalification	on Certificate and				
		YES, upload the applicable DAS Prequalistatement to BizNet <i>prior</i> to the date and time							
		Not Applicable - Construction Costs Less than \$500,000							
		Class of Work:		DAS Prequalifica	have the applicable ation Certificate and d) Statement?				
	2.1	General Building Construction (Group A):	]	YES	NO 🗆				
	2.2	☐ General Building Construction (Group B):	]	YES 🗆	NO 🗆				
	2.3	☐ General Building Construction (Group C):	]	YES 🗆	NO 🗆				
	2.4	General Trades (Interior Work Only):		YES 🗆	NO 🗆				
	2.5	☐ CPS Projects ONLY: Insert Class of Work		YES	NO 🗆				

PAGE 2 OF 7

3.0	<b>Firm's Present Legal Name:</b> (the <i>complete</i> <b>legal name</b> <i>exactly</i> as it appears with the <b>Secretary of State registry</b> . The appropriate <b>title</b> must be used throughout the documents, for example:		
	Genera Name:	l Partner, Member, Manager, Sole Member, etc.)	
	ivaille.		
4.0	How m	nany years has your Firm been in business under its <b>Present Legal Name</b> ?	
5.0	How m	any years has your Firm been in business as a General Contractor?	
6.0		e <u>all</u> other <b>names</b> by which your Firm has been known and the <b>length of time</b> by each name:	
	6.1	Years Months	
	6.2	Years Months	
	6.3	Years Months	
7.0	This Fi	rm's Certification with the CT Secretary of State:	
	Check Box	Type of Business Entity: Certification Year	
		Corporation	
		Partnership	
		Sole Proprietorship	
		Other:	
		Oulei.	
8.0	and Su a bidde numbe	resumes of all <b>supervisory personnel</b> , such as <b>Principals</b> , <b>Project Managers</b> , <b>uperintendents</b> , who will be directly involved with the project on which you are now er. Indicate their construction related training, certifications and licenses and the r of years of actual construction experience. Indicate the number of years of this construction experience which were in a Supervisory capacity.	

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9.0	Named Subcontractor – Bidder Intends to Self-Perform:							
	Check YES or NO for each "Named Subcontractor" Class of Work which your firm intends to perform with its own employees for this Contract; see Section 2.7 of Section 00 41 00 Bid Proposal Form.							
	NOTE: For Projects with Construction Costs estimated to be greater than \$500,000, complete Section 00 45 17 Named Subcontractor Bidder's Qualification Statement for each Named Subcontractor Class of Work checked YES and submit within ten (10) calendar days <i>after</i> receipt of the "Set-Aside Contractor Schedule Request" from DAS/CS Office of Legal Affairs, Policy, and Procurement.							
		Not Applicable – No Named Subcontract	ors	&/or No	t Self-Pei	rformin	g	
		Named Subcontractor Class of Work			is Named S		elf-perform actor	
	9.1	Electrical:		YES		NO		
	9.2	HVAC:		YES		NO		
	9.3 Masonry:			YES		NO		
	9.4 Plumbing:			YES		NO		
	9.5	Environmental Remediation:		YES		NO		
	9.6	Hazardous Materials Abatement:		YES		NO		
10.0	<ul> <li>Named Subcontractor - Class of Work Greater than \$500,000 and Self-Performing:         <ul> <li>Select the applicable Named Subcontractor Class of Work which your firm intends to perform with its own employees for this Contract.</li> <li>Select YES if your Firm has the applicable the DAS Prequalification Certificate and Update (Bid) Statement or NO if it does not.</li> <li>If YES, submit the applicable DAS Prequalification Certificate and Update (Bid) Statement within ten (10) calendar days after receipt of the "Set-Aside Contractor Schedule Request" from DAS/CS Office of Legal Affairs, Policy, and Procurement.</li> </ul> </li> </ul>							
		□ Not Applicable – No Class of Work Greater \$500,000 &/or Not Self-Performing					rforming	
		Named Subcontractor Class of Work Greater Than \$500,000			Does your Firm have the applicable DAS Prequalification Certificate and Update (Bid) Statement?			
	10.1	☐ Electrical:	)	YES		NO		
	10.2	☐ HVAC:		YES		NO		
	10.3	☐ Masonry:		YES		NO		
	10.4							

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<u>all</u> bio	of the information listed below der does not make <b>all</b> requi	r Firm has completed in the <u>past five (5) years.</u> Provide w. DAS/CS may reject a bid as <b>non-responsive</b> if the ired pre-award submittals within the designated time as necessary <u>using the following format</u> :
yea ag coi Se	ars shall be (1) single project of gregate projects; (2) of comme mpliance with general require ction 00 11 16 Invitation to Bi	the construction projects completed in the past five (5) contracts that have reached substantial completion, not ercial and/or institutional construction work (this includes ements); (3) within the Cost Estimate Range stated in d for this project; and (4) of the size and complexity of two such projects shall result in rejection of the bid.
11.1	Project Title:	
11.2	Project Location:	
11.3	Construction Start Date:	
11.4	Construction Finish Date:	
11.5	Describe the Scope of Work your Firm performed:	
11.6	Original Contract Amount:	
11.7	Final Contract Amount:	
11.8	Original Contract Duration (Calendar Days):	
11.9	Final Contract Duration (Calendar Days):	
11.10	Owner:	
11.11	Owner's Representative:	(Name) (Phone Number)
11.12	Design Firm:	(Marie)
11.13	Design Firm's Representative:	
		(Name) (Phone Number)
12.0 References:  Furnish references from architects, engineers or owners indicating that your Firm has satisfactorily completed in a timely manner contract work for projects within the cost estimate range, size and complexity of this project. Provide explanations where delays have occurred. This information should cover work done over the past five years.		
<ul> <li>13.0 Construction Scheduler:         <ul> <li>For Projects greater than \$5 Million: Submit the name, resume and references of the Construction Scheduler in accordance with the requirements called for in Section 01 32 16.13 Critical Path Method Schedules of the General Requirements.</li> <li>Not Applicable – Project Less Than \$5 Million</li> </ul> </li> </ul>		

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14.0	List and explain if your Firm has ever failed to complete a contract or if any officer or partner of your Firm has ever been an officer or partner of another organization that failed to complete a contract. Indicate below the circumstances leading to the project failure and the name of the company which provided the bonding for the failed contract(s):  Not Applicable
15.0	List and explain if your Firm has ever had a contract terminated, indicating the
	circumstances leading to the project termination of contract(s):  Not Applicable
16.0	List and explain all legal or administrative proceedings against your Firm or any officers, principals, partners, members, or employees of the organization currently pending or concluded adversely within the last five years, and any judicial or administrative sanctions that are still in effect against such organization, and any of its officers, principals, partners, members, or employees. (Exclude Occupational Safety and Health Act [OSHA] violations which are called for elsewhere in this statement). Add attachments as necessary.
	Not Applicable
17.0	List and explain any disbarments or suspensions that have been imposed on your Firm in the past five years or that were still in effect during the five year period or that are still in effect. Such list must include disbarments and suspensions of officers, principals, partners, members, and employees of your Firm:  Not Applicable
18.0	List and explain any other reason(s) that precludes your Firm or any officer, principal, partner, member, or employees thereof from bidding on a contract in Connecticut or any other jurisdiction:  Not Applicable
19.0	List and explain all willful or serious violations your Firm has had of any OSHA or of any standard, order or regulation promulgated pursuant to such act, during the three year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Act or Occupational Safety and Health Act of 1970. Indicate whether these were abated within the time fixed by the citation or whether the citation was appealed. If appealed what is the status or disposition. Add attachments as necessary.  Not Applicable

P	Δ	G	F	6	<b>n</b>	F	7

20.0	List and explain any criminal convictions your Firm has had related to the injury or death of any employee in the three-year period preceding the bid: Add attachments as necessary.  Not Applicable
	Trot Applicable
21.0	List and explain any changes in your Firm's financial condition or business organization, which might affect your Firm's ability to successfully complete this contract:
	Not Applicable
<u> </u>	
22.0	<b>NEW:</b> List and explain if your Firm has ever failed to submit an Affirmative Action Plan to the Commission on Human Rights and Opportunities (CHRO). Indicate below the circumstances leading to the failure to submit the Affirmative Action Plan to CHRO:  Not Applicable
23.0	NEW: List and explain if your Firm's Affirmative Action Plan has ever been disapproved by CHRO or determined to be noncompliant. Indicate below the circumstances leading to the disapproval or finding of noncompliance of your Affirmative Action Plan by CHRO:  Not Applicable

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24. Signature			
Dated at			
Signed this	day of , 20		
Name of Firm:			
Firm Address:			
Signature:			
Print or Type Name:			
Title:			
	25. Notary Statement		
Mr./Mrs./Ms.	being duly sworn		
deposes and says that he/she is the   (Position or Title)			
, and that the answers to the foregoing			
(Firm Name) questions and all statements therein contained are true and correct.			
Subscribed and sworn before me this day of , 20			
Notary Public			
My Commission Expires , 20			

End of Section
00 45 14 General Contractor Bidder's Qualification Statement

PAGE 1 OF 3

# Objective Criteria Established for Evaluating Qualifications of Bidders:

CT DAS ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

The following items are established pursuant to Sections 4b-92, 4b-94 and 4b-95a of the Connecticut General Statutes (C.G.S.) as amended.

The Objective Criteria Established for Evaluating Qualifications of Bidders (Section 00 45 15) are to assure that the State of Connecticut will secure the "lowest responsible and qualified bidder" who has the ability and capacity to successfully complete the Bid Proposal Form and the Work. Failure to comply with any portion of this requirement may cause rejection of the bid. Note: Individual Specification Sections may contain General Contractor and/or Subcontractor Qualification requirements that exceed those in Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders.

THE BIDDER MUST HAVE OR HAVE COMPLETED THE FOLLOWING:

### 1.1 DAS Prequalification Requirements:

For Projects with Construction Costs greater than \$500,000, all Bidders shall upload to BizNet a valid Department of Administrative Services (DAS) **Prequalification Certificate** and **Update (Bid) Statement** *prior* to the date and time of the Bid Opening.

1.2	Evalu	Evaluation:		
	1.2.1	All Bidders shall upload to BizNet Section 00 45 14 General Contractor's Bidder Qualifications Statement <i>prior</i> to the date and time of the Bid Opening.		
	1.2.2	If applicable, the Three (3) Lowest Bidders shall submit Section 00 45 17 Named Subcontractor's Bidder Qualification Statement(s) to DAS Construction Services (DAS/CS) Office of Legal Affairs, Policy, and Procurement within ten (10) calendar days <i>after</i> receipt of the "Set-Aside Contractor Schedule Request" <i>from</i> DAS/CS.		
1.2.3 The Bidder must demonstrate that the Bidder and, if applicable, its Named Subcont objective criteria for this specific project.		The Bidder must demonstrate that the Bidder and, if applicable, its Named Subcontractors, meet the <b>objective criteria</b> for this specific project.		
	1.2.4	The <b>responses</b> to the Statement(s) must identify two (2) <b>projects completed</b> – single project contracts that have reached substantial completion, not aggregate projects – of commercial and/or institutional construction work (this includes compliance with general requirements) during the past five (5) years within the Cost Estimate Range stated in Section 00 11 16 <b>Invitation to Bid</b> for this project, and of the size and complexity of this project. The failure to identify to such projects shall result in rejection of the bid.		
	1.2.5	If the Bidder identifies two projects that meet the above criteria, the <b>State's evaluation</b> shall be based on the <b>performance record</b> of the prospective Bidder as a general, prime contractor and its named subcontractors during the course of the two (2) comparable projects, and not just the end result. The state will conduct the evaluation based on its interpretation of its objective criteria. <b>Evaluation criteria</b> shall include: Faithful and efficient performance; fulfilment of contract obligations; financial, managerial and technical abilities; and integrity and the absence of any conflicts of interest. Any one or all of the factors noted in this paragraph as well as in the other criteria set forth in this <b>Section 00 45 15</b> may be grounds for the determination by the State, in its sole discretion, of the Bidder's responsibility and qualifications necessary for the faithful performance of the work required of this project.		

### 1.3 References:

Furnished **references from architects**, **engineers or owners** indicating that it has satisfactorily completed in a timely manner contract work for projects and provide explanations where delays have occurred. This information should cover work done over the **past five years**. Review of DAS/CS projects shall be included in the evaluation of the bidder's qualifications and anticipated future performance.

### 1.4 Qualified Personnel:

- 1.4.1 Shown that it customarily employs or has on its payroll **supervisory personnel**, **qualified** to perform the work required for this project and to coordinate the work called for in the Bid Specifications.
- 1.4.2 If the project is for \$5 Million or more, submit the name, resume and references of the Construction Scheduler in accordance with the requirements called for in Section 01 32 16.13 Critical Path Method Schedules of the General Requirements.

### 1.5 Past Performance:

Demonstrated a good track record of **past performance** on State or other projects relative to quantity, quality, timeliness, cost, cooperation and harmonious working relationships with subcontractors, suppliers and client agencies. DAS/CS will review the Bidders past performance ratings prepared by DAS/CS or prepared as part of the DAS Contractor Prequalification Program. This review may focus on the comments relative to: Quality of Supervision, Adherence to Contract Documents, On Time Project Completion, Subcontractor performance, and the handling of Change Orders. Unacceptable ratings for several criteria shall be sufficient cause to deem a bidder not responsible.

### 1.6 Financial Responsibility:

Shown that it is **financially responsible** to perform the work as bid. If requested, additional financial information shall be provided. Prompt and proper payments to its subcontractors and material suppliers is a critical factor to be considered by DAS/CS.

### 1.7 [Left Blank]

### 1.8 Equipment Requirements:

Shown that it owns or possesses, rented, or leased **equipment** of the type customarily required by contractors in the performance of contract work and that such equipment, if needed, is available for this project.

### 1.9 Materials and Suppliers:

Purchased **materials** over the past three years from suppliers who customarily sell such materials in quantity to contractors.

### 1.10 Physical Facilities:

Control of adequate **physical facilities** from which the work can be performed.

### 1.11 Compliance with Subcontractor Requirements:

Demonstrated that on **previous state projects** the bidder complied in good faith with the requirements of listing subcontractors as outlined in C.G.S. Sections 4b-93 and 4b-95.

### 1.12 Threshold Building and Major Contractor Requirements:

Demonstrated that **all major subcontractors** are in compliance with the provisions of C.G.S. Section 20-341gg, as revised, concerning licensure requirements to perform work on any structure that exceeds the threshold limits contained in C.G.S. Section 29-276b, as revised.

### 1.13 OSHA Requirements:

Proven that the Bidder has not been found to be in violation of three or more willful or serious violations of Occupational Safety and Health Administration (OSHA) regulations in the past three years.

PAGE 3 OF 3

### 1.14 Criminal Convictions and Injuries or Death of Employees:

Not received a **criminal conviction** related to the injury or death of any employee in the three-year period preceding the bid.

### 1.15 Legal or Administrative Proceedings:

Listed all **legal** (court and/or arbitration) or **administrative proceedings** currently pending as well as any legal (court and/or arbitration) or administrative proceeding related to procurement or performance of any public or private construction contracts which has concluded adversely within the last three years.

### 1.16 Contract Performance and Surety:

Identified any situations where: (1) the bidder failed to complete a construction contract; or (2) bonds were called during the past three years. If applicable, attach a sheet providing explanation including date(s) and location(s).

### 1.17 State Tax Requirements:

Not been found to be in violation of any **state tax** requirements of the Connecticut Department of Revenue Services in the five (5)-year period preceding the bid.

### 1.18 State and Federal Labor Requirements:

Not been found to be in violation of any State or Federal **labor laws** as required through the Department of Labor including violations of prevailing wage laws in the five (5)-year period preceding the bid.

### 1.19 Change Order Pricing and State Ethics:

Been found to be in compliance with all statutory and regulatory requirements. This Item shall include, but not be limited to, any DAS/CS determinations related to improper Change Order pricing relative to C.G.S. Section 1-101nn of The State Ethics Statutes.

### 1.20 Internal Revenue Services (IRS) Requirements:

Not been found in violation of any of the **Internal Revenue Service Tax Requirements** regarding classification of employees and independent contractors in the five (5)-year period preceding the bid.

### 1.21 Workers Compensation and Insurance Requirements:

Not been found to be in any violation of C.G.S. Section 31-288 relating to employee classification for purposes of Workers' Compensation insurance premiums in the five (5)-year period preceding the bid.

NOTE: The foregoing Item Numbers 1.13 and 1.14 are meant to comport with C.G.S. Section 31-57b.

End of Section 00 45 15 Objective Criteria Established for Evaluating Qualifications of Bidders

PAGE 1 OF 7

# Named Subcontractor Bidder's Qualification Statement

DAS ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

#### Instructions:

- This Section is only applicable to Projects with Construction Costs Greater than \$500,000.00. See Subsection 2.7 Named Subcontractors and Classes of Work of 00 41 00 Bid Proposal Form for applicability.
- If a question or request for information does not pertain to your organization in any way, use the symbol "NA" (Not Applicable). Attach additional information on 8 ½" x 11" sheets with your letterhead as necessary and reference specific subsection number.
- · Submit this form for *each* of the Named Subcontractors, within **ten (10)** calendar days **after** receipt of the "Set-Aside Contractor Schedule Request" to:

State of Connecticut

Department of Administrative Services, Construction Services

Office of Legal Affairs, Policy, and Procurement

	450 Columbus Boulevard, S Hartford, CT 06103	
1.0	Project Information:	
	1.1 DAS/CS Project Number:	
	1.2 Project Name:	
	1.3 Project Location:	
2.0	Named Subcontractor Class of V	Vork:
	Check the applicable Class of Wor	<b>&lt;</b> :
	2.1 Electrical Work:	
	2.2 HVAC Work:	
	2.3 Masonry Work:	
	2.4 Plumbing Work:	
	2.5 Environmental Remediation	n:
	2.6 Hazardous Materials Abate	ment:
3.0	Subcontractor's Present Legal N	lame:
	Name:	

PAGE 2 OF 7

4.0	How m	any years has the <b>Subcontractor</b> been in business under its <b>Present Legal Name</b> ?	
5.0	How m of Wor		
6.0	If the <b>Subcontractor</b> has not always been a Subcontractor for this Class of Work then list the trade(s) that your firm customarily performed prior to the time that you became a Subcontractor in this <b>Class of Work</b> :		
	6.1		
	6.2		
	6.3		
7.0	O Indicate all other names by which this Subcontractor has been known and the length of time known by each name:		
	7.1	Years Months	
	7.2	Years Months	
	7.3	Years Months	
8.0	The-Su	bcontractor's Certification with the CT Secretary of State:	
	Check Box	Type of Business Entity: Certification Year	
		Corporation	
		Partnership	
		Sole Proprietorship	
		Limited Liability Company (LLC)	
		Other:	

9.0 Attach resumes of all supervisory personnel, such as Principals, Project Managers, and Superintendents, who will be directly involved with this project on which you are now a Named Subcontractor Bidder for a specific Class of Work. Indicate the number of years of construction experience and number of years of which they were in a Supervisory capacity.

10.0	List all sub-trades which your firm customarily performs with own employees – this table must be completed for electrical and plumbing trades for all projects.								
		Trade Name		License Holder Name		Connecticut D.C.P. License No.: Format: Prefix - Number - Suffix			
	10.1								
	10.2								
	10.3								
	10.4								
	10.5								

### 11.0 Trade References:

Names, addresses and telephone numbers of several firms with whom your organization has regular business dealings (attach separate sheets as necessary).

12.0	<b>2.0 List</b> <u>all</u> construction projects your firm currently has under contract. Provide <u>all</u> of the information listed below. DAS/CS <i>may</i> reject a bid as <b>non-responsive</b> if the bidder does not make all required pre-award submittals within the designated time period. Attach additional sheets as necessary <u>using the following format</u> :								
	12.1	Project Title:							
	12.2	Project Location:							
	12.3	Construction Start Date:							
	12.4	Construction Finish Date:							
	12.5	Describe the Scope of Work your Firm performed:							
	12.6	Original Contract Amount:							
	12.7	Final Contract Amount:							
	12.8	Original Contract Duration (Calendar Days):							
	12.9	Final Contract Duration (Calendar Days):							
	12.10	*Briefly describe any complaints about your Firm's quality control or construction management.							
		*Attach a separate sheet if more	space is required.						
	12.11	Owner:							
	12.12	Owner's Representative:	(Name)	(Phone Number)					
	12.13	Design Firm:							
	12.14	Design Firm's Representative:	(Name)	(Phone Number)					
	12.15	General Contractor:	(1.46.114)						
	12.16	G.C.'s Representative:							
			(Name)	(Phone Number)					

13.0	List <u>all</u> construction projects your firm has completed in the <u>past five (5) years or list the ten (10) projects</u> your firm has most recently completed. Provide <u>all</u> of the information listed below. DAS/CS <i>may</i> reject a bid as <b>non-responsive</b> if the bidder does not make all required pre-award submittals within the designated time period. Attach additional sheets as necessary <u>using the following format</u> :								
	13.1	Project Title:							
	13.2	Project Location:							
	13.3	Construction Start Date:							
	13.4	Construction Finish Date:							
	13.5	Describe the Scope of Work your Firm performed:							
	13.6	Original Contract Amount:							
	13.7	Final Contract Amount:							
	13.8	Original Contract Duration (Calendar Days):							
	13.9	Final Contract Duration (Calendar Days):							
	13.10	*Briefly describe any complaints about your Firm's quality control or construction management.							
		*Attach a separate sheet if more	space is required.						
	13.11	Owner:							
	13.12	Owner's Representative:							
	13.13	Design Firm:	(Name)	(Phone Number)					
	13.14	Design Firm's Representative:	(Name)	(Dhono Niverban)					
	13.15	General Contractor:	(Name)	(Phone Number)					
	13.16	G.C.'s Representative:							
			(Name)	(Phone Number)					

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14.0	Has your Firm ever failed to complete a contract or has any officer or partner of your Firm ever been an officer or partner of another organization that failed to complete a contract? If so, indicate below the circumstances leading to the project failure and the name of the company which provided the bonding for the failed contract(s):  Not Applicable						
15.0	<ul> <li>List all legal or administrative proceedings currently pending or concluded adversely within the last five years which relate to procurement or performance of any public or private construction contracts. (Exclude Occupational Safety and Health Act [OSHA] violations which are called for elsewhere in this statement). Add attachment as necessary.</li> <li>Not Applicable</li> </ul>						
16.0	List all willful or serious violations of any OSHA or of any standard, order or regulation promulgated pursuant to such act, during the three year period preceding the bid, provided such violations were cited in accordance with the provisions of any State Occupational Safety and Health Act or Occupational Safety and Health Act of 1970. Indicate whether these were abated within the time fixed by the citation or whether the citation was appealed. If appealed what is the status or disposition. Add attachments as necessary.  Not Applicable						
,							
17.0	Has your Firm had any criminal convictions related to the injury or death of any employee in the three-year period preceding the bid? Please list any such convictions below. Add attachments as necessary.  Not Applicable						

18. Signature								
Dated at								
Signed this	day of							
Name of Firm:								
Firm Address:								
	(Signature)							
	(Print or Type Name)							
	(Title)							
	(Title)							
	19. Notary Statement							
Mr./Mrs./Ms.	being duly sworn							
deposes and says th	nat he/she is the of							
	(Position or Title)							
	, and that the answers to the foregoing  (Firm Name)							
	questions and all statements therein contained are true and correct.							
Subscribed and swo	rn before me this day of , 20 , 20							
Notary Public								
My Commission Exp	pires							

00 45 17 Named Subcontractor Bidder's Qualification Statement

### Contract

### DAS I Construction Services I Office of Legal Affairs, Policy, and Procurement

Contract For:						
Dated as of	by and between the State of Connecticut (herein called the					
_	(Month, Day, Year)					
"State") acting he	"State") acting herein by its Commissioner, Department of Administrative Services under the					
provisions of the	Connecticut General Statutes (C.G.S.) Sections 4-8, 4a-1, 4a-1a, 4a-2, 4b-1, and 4b-3,					
as revised, and	(herein called the "Contractor").					
	(Print Name of Contractor)					

WITNESSETH, that the State and the Contractor in consideration of the hereinafter contained mutual promises and covenants, do hereby agree as follows:

#### 1. CONTRACT AND CONTRACT DOCUMENTS:

The Invitation for Bids, the enumerated Plans, the Specifications and Amendments thereto, the Addenda, the Bid Proposal as accepted by the Commissioner, Department of Administrative Services, Order of Award, which Order is made a part of this Contract, the General Conditions, the General Requirements, the Contract and the Bonds shall form part of this Contract and the provisions thereof shall be as binding upon the parties as if they were fully set forth herein. The tables of contents, titles, headings, running headlines and marginal notes contained herein and in said Documents, are solely to facilitate to various provisions of the Contract Documents and in no way affect, limit, or cast light upon the interpretations of the provisions to which they refer. Whenever the term "Contract Documents" is used, it shall mean and include this Contract, the Invitation for Bids, the enumerated Plans, Specifications and Amendments thereto, the Addenda, the Bid Proposal as accepted by the Commissioner, Department of Administrative Services, the General Conditions, the General Requirements, the Bonds, the Notice to Bidders, the Wage Scales, the Supplementary Conditions, and the Insurance Certificates.

### 2. SCOPE OF THE WORK:

The Contractor shall furnish all plant, labor, materials, supplies, equipment, and other facilities and things necessary or proper for or incidental to the work contemplated by this Contract as required by and in strict accordance with applicable Plans, Specifications and Amendments thereto, and Addenda (hereinafter enumerated), and as required by and in strict accordance with such changes as are ordered and approved pursuant to this Contract, and will perform all other obligations imposed on him by this Contract.

### 3. ENUMERATION OF PLANS, SPECIFICATIONS AND ADDENDA:

The following is an enumeration of the Plans, Specifications, and Addenda:

Prepared By:	
	(Print Name of Architect/Engineer Firm)
Plans and Specifications:	
Addenda:	
COMPENSATION TO B	E PAID THE CONTRACTOR
The State will pay and t	he Contractor will accept in full consideration for the performance
of the Contractor's oblig	gation hereunder the sum of:
	Dollars and 00/100 (\$ )

### 5. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion.

For all State contracts as defined in the **C.G.S.** §9-612(f)(1)(C), having a value in a calendar year of \$50,000 or more or a combination or series of such agreements or contracts having a value of \$100,000 or more, the authorized signatory to this Agreement expressly acknowledges receipt of the State Elections Enforcement Commission's notice advising state contractors of campaign contribution and solicitation prohibitions, and will inform its principals of the contents of the notice. See **SEEC Form 10**.

Contractor hereby irrevocably assigns to the State of Connecticut all rights, title and interest in and to all Claims\* associated with this Contract that Contractor now has or may or will have and that arise under the antitrust laws of the United States, 15 USC Section 1, et seq. and the antitrust laws of the State of Connecticut, C.G.S. §35-24, et seq., including but not limited to any and all Claims for overcharges. This assignment shall become valid and effective immediately upon the accrual of a Claim without any further action or acknowledgment by the parties.

\*Definition of Claims associated with this Contract: "All actions, suits, claims, demands, investigations and proceedings of any kind, open, pending or threatened, whether mature, unmatured, contingent, known or unknown, at law or in equity, in any forum."

4.

**IN WITNESS WHEREOF,** the Commissioner, Department of Administrative Services for and on behalf of the State of Connecticut, and the Contractor have executed this contract on the day and year first written.

Attested By	:		State Of Connecticut
WITNESS:		Ву:	
	(Signature)	] -7.	(Signature)
Print Name:		Print Name:	Melody A. Currey
		l Its:	Commissioner
WITNESS:			Department of Administrative Services
	(Signature)		
Print Name:		Date Signed:	
			SEAL
		Contractor:	
WITNESS:		Ву:	
	(Signature)		(Signature)
Print Name:		Its:	, Duly Authorized
		Print Name:	
WITNESS:		Date Signed:	
5	(Signature)		
Print Name:			

End of Section 00 52 03 Contract

### **Subcontract Agreement Form**

### DAS ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

In accordance with the requirements of the Connecticut General Statutes (C.G.S.) §4b-96, the Contractor selected for the Contract shall provide to each of its listed or substitute Named Subcontractors the relevant subcontract, along with a notice setting forth the time limit for execution of such subcontract. The Contractor selected for the Contract shall file with the State of Connecticut Department of Administrative Services (DAS) Construction Services Office of Legal Affairs, Policy, and Procurement an executed copy of each subcontract within ten (10) days (Saturdays, Sundays and legal holidays excluded) of presentation of the subcontract to each subcontractor. Each subcontract shall include at least the provisions set forth in the **Subcontract** form found in C.G.S. §4b-96 and shall follow the order of this **Subcontract Agreement Form**.

## C.G.S. §4b-96. Subcontract, form. Procedure on failure of subcontractor to execute subcontract. General bidder's responsibilities.

Within five days after being notified of the award of a general contract by the awarding authority, or, in the case of an approval of a substitute subcontractor by the awarding authority, within five days after being notified of such approval, the general bidder shall present to each listed or substitute subcontractor (1) a subcontract in the form set forth in this section and (2) a notice of the time limit under this section for executing a subcontract. If a listed subcontractor fails within five days, Saturdays, Sundays and legal holidays excluded, after presentation of a subcontract by the general bidder selected as a general contractor, to perform his agreement to execute a subcontract in the form hereinafter set forth with such general bidder, contingent upon the execution of the general contract, the general contractor shall select another subcontractor, with the approval of the awarding authority. When seeking approval for a substitute subcontractor, the general bidder shall provide the awarding authority with all documents showing (A) the general bidder's proper presentation of a subcontract to the listed subcontractor and (B) communications to or from such subcontractor after such presentation. The awarding authority shall adjust the contract price to reflect the difference between the amount of the price of the new subcontractor and the amount of the price of the listed subcontractor if the new subcontractor's price is lower and may adjust such contract price if the new subcontractor's price is higher. The general bidder shall, with respect to each listed subcontractor or approved substitute subcontractor, file with the awarding authority a copy of each executed subcontract within ten days, Saturdays, Sundays and legal holidays excluded, of presentation of a subcontract to such subcontractor. The subcontract shall be in the following form:

(See page 2 and page 3)

### **SUBCONTRACT**

THIS AGREEMENT made this day of , 20, by and between a corporation organized and existing under the
laws of (a partnership consisting of ) (an individual doing business as ) hereinafter called the "Contractor" located at
(insert complete address), and a corporation organized and
existing under the laws of (a partnership consisting of ) (an individual doing business as ) hereinafter called the
"Subcontractor", located at (insert complete address)

WITNESSETH that the Contractor and the Subcontractor for the considerations hereafter named, agree as follows:

1. The Subcontractor agrees to furnish all labor and materials required for the completion of all work specified in Section No. of the specifications for (Name of Subtrade) and the plans referred to therein and addenda No., and for the (Complete title of project and the project number taken from the title page of the specifications) all as prepared by (Name of Architect or Engineer) for the sum of (\$) and the Contractor agrees to pay the Subcontractor said sum for said work. This price includes the following alternates:

Sup	plemental	No.	(s)	),	,	,	,	,	,	,	

- (a) The Subcontractor agrees to be bound to the Contractor by the terms of the hereinbefore described plans, specifications (including all general conditions stated therein which apply to his trade) and addenda No. , , , and , and , and to assume to the Contractor all the obligations and responsibilities that the Contractor by those documents assumes to the (Awarding Authority) , hereinafter called the "Awarding Authority", except to the extent that provisions contained therein are by their terms or by law applicable only to the Contractor.
- (b) The Contractor agrees to be bound to the Subcontractor by the terms of the hereinbefore described documents and to assume to the Subcontractor all the obligations and responsibilities that the Awarding Authority by the terms of the hereinbefore described documents assumes to the Contractor, except to the extent that provisions contained therein are by their terms or by law applicable only to the Awarding Authority.
- 2. The Contractor agrees to begin, prosecute and complete the entire work specified by the Awarding Authority in an orderly manner so that the Subcontractor will be able to begin, prosecute and complete the work described in this subcontract; and, in consideration thereof, upon notice from the Contractor, either oral or in writing, the Subcontractor agrees to begin, prosecute and complete the work described in this Subcontract in an orderly manner in accordance with completion schedules prescribed by the general contractor for each subcontract work item, based on consideration to the date or time specified by the Awarding Authority for the completion of the entire work.
- 3. The Subcontractor agrees to furnish to the Contractor, within a reasonable time after the execution of this subcontract, evidence of workers' compensation insurance as required by law and evidence of public liability and property damage insurance of the type and in limits required to be furnished to the Awarding Authority by the Contractor.
- 4. The Contractor agrees that no claim for services rendered or materials furnished by the Contractor to the Subcontractor shall be valid unless written notice thereof is given by the Contractor to the Subcontractor during the first forty (40) days following the calendar month in which the claim originated.
- 5. This agreement is contingent upon the execution of a general contract between the Contractor and the Awarding Authority for the complete work.

**IN WITNESS WHEREOF,** the parties hereto have executed this agreement the day and year first above-written.

	Subcontractor								
		Ву:	Subcontractor  (Print Name)						
	SEAL	lts:	Duly Authorized						
ATTEST:	(Signature)		(Subcontractor Signature)						
Date:		Date:							
	Contractor								
		Ву	Contractor						
			(Print Name)						
	SEAL	lts	Duly Authorized						
ATTEST:	(Signature)		(Contractor Signature)						
Date:		Date:							

End of Section 00 52 73 Subcontract Agreement Form

ACORD CER	ΓIF	IC	ATE OF LIA	BIL	ITY IN	SURA	NCE	DATE	MM.DD.YYYYY)
THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.									
IMPORTANT: If the certificate holder the terms and conditions of the policy certificate holder in lieu of such endor	, cert	ain p	olicies may require an e						
PRODUCER				CONTA NAME:	CT				
				PHONE	n. Eutir		FAX (A.C. No:		
				E MAIL ADDRE	55		10-31-00		
						URER/S) AFFOR	RDING COVERAGE		NAIC#
				INSURER A:					
INSURED		-		INSURE					
Contractor's Legal Na	me a	and	Address	INSURE					
				INSURE					
				INSURE					
				INSURE					
COVERAGES CER	TIFIC	CATE	NUMBER:				REVISION NUMBER:		
THIS IS TO CERTIFY THAT THE POLICIES INDICATED. NOTWITHSTANDING ANY R CERTIFICATE MAY BE ISSUED OR MAY EXCLUSIONS AND CONDITIONS OF SUCH	PERT POLI	AIN, CIES.	NT, TERM OR CONDITION THE INSURANCE AFFORD	OF AN	Y CONTRACT THE POLICIE REDUCED BY	OR OTHER IS S DESCRIBED PAID CLAIMS	DOCUMENT WITH RESPE	CT TO	WHICH THIS
NSR LTR TYPE OF INSURANCE	ADDL	SUUR	POLICY NUMBER		(MM/DD/YYYY)	(MM/DD/YYYY)	LIMI	rs	
GENERAL LIABILITY			Delian Name		Policy	Policy	EACH OCCURRENCE	\$	1,000,000
✓ COMMERCIAL GENERAL LIABILITY			Policy Number m	nust		Expiration	DAMAGE TO RENTED PREMISES (Ea occurrence)	8	100,000
CLAMS-MADE   ✓ OCCUR			be provided		Effective Date	Date must	MED EXP (Any one person)	8	5,000
_					must be	be	PERSONAL & ACY INJURY	s	1,000,000
						provided	GENERAL AGGREGATE	8	2,000,000
GENL AGGREGATE LIMT APPLIES PER POLICY					provided		PRODUCTS - COMPYOP AGG	\$	2,000,000
AUTOMOBILE LIABILITY			D-EN		Policy	Policy	COMBINED SINGLE LIMIT (Ea scodent)	s	1,000,000
✓ ANY AUTO			Policy Number m	nust	Effective	Expiration	BODILY INJURY (Per person)	\$	
ALL OWNED SCHEDULED			be provided		Date must	Date must be	BODILY INJURY (Per accident)	8	
HIRED AUTOS AUTOS AUTOS AUTOS					be provded		PROPERTY DAWAGE (Per accident)	\$	
Harris Harris						provided	V 47 310 4010	8	
UMBRELLA LIAD OCCUR							EACH OCCURRENCE	s	
EXCESS LIAD CLAIMS-MADE							AGGREGATE	\$	
DED RETENTION \$	1							8	
WORKERS COMPENSATION			5 ° N		Policy	Policy	✓ WC STATU- TORY LIMITS OTH		
AND EMPLOYERS' LIABILITY  ANY PROPRIETOR PARTNER EXECUTIVE			Policy Number m	nust	Effective	Expiration	E.L. BACH ACCIDENT	8	100,000
OFFICERMENSER EXCLUDED? (Mandatory in NH)	N/A		be provided		Date must	Date must	E.L. DISEASE - EA EMPLOYE	s	.100,000
If yes, describe under DESCRIPTION OF OPERATIONS below					be provided	be provided	E.L. DISEASE - POLICY LIMIT	8	500,000
							Bodilylinjury or Death (per occ.) Total		\$ 1,000,000
Owner's and Contractor's Protective Liability							Propety Damages Total (aggregate)		\$ 2,000,000
Builder's Risk (include here when applicable)									Completed Value
DESCRIPTION OF OPERATIONS / LOCATIONS / VEHIC	LES (	Attach a	ACORD 101, Additional Remarks	Schedule	, if more space is	required)			
Indicate Project Number and Title h	ere								
The State of Connecticut is an Add	itiona	al Ins	ured with respect to G	Senera	I Liability ar	nd Umbrella	a/Excess Liability Ins	urance	coverage.
If Builder's Risk and or Inland Marin	ne/Tr	ansit	Insurance is required	then	the State is	endorsed a	as a Loss Payee.		
CERTIFICATE HOLDER				CAN	CELLATION				
State of Connecticut Department of Administrative Services, Construction Services Office of Legal Affairs, Policy and Procurement				SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.					
450 Columbus Boulevard, Suite 13	302			AUTHO	RIZED REPRESE	IVITATIVE			
Hartford, CT 06103-1838									
				Ι ′	Agent of F	roaucer			
				_	@ 10	88-2010 AC	ORD CORPORATION.	All ries	ats reserved
ACORD 25 (2010/05)	т	he A	CORD name and logo a	re regi				- un riigi	reserveu.

**End of Section** 00 62 16 Certificate of Insurance

### **Asbestos Abatement Liability Insurance**

DAS ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

Contractor shall provide Asbestos Abatement Liability insurance with limits of no less than \$1,000,000.00 per occurrence. Such insurance shall include all operations associated with hazardous materials removal and shall be written on an occurrence basis form. The State of Connecticut shall be named as an Additional Insured.

Asbestos abatement coverage may alternatively be provided under a Commercial General Liability policy provided the policy is specifically endorsed to provide asbestos abatement coverage.

End of Section 00 62 16.1 Asbestos Attachment To Accord Form

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### ARTICLE 1 DEFINITIONS

WHENEVER THE FOLLOWING TERMS, OR PRONOUNS IN PLACE OF THEM, ARE USED THE INTENT AND MEANING SHALL BE AS FOLLOWS:

- **1.1 ACCEPTANCE:** The Owner's acknowledgement of the Work from the Contractor upon certification by the Construction Administrator and Architect or Engineer that all Work has been completed.
- **1.2 ADDITIONAL OR DELETED WORK:** Work required by the Department that, in the judgment of the Com-missioner, involves any addition to, deduction from, or modification of the Work required by the Contract Documents.
- **1.3 AGENCY:** The (User) Agency of the State of Connecticut having administrative authority of the facility in which the Work is being performed.
- 1.4 APPLICATION FOR PAYMENT, PARTIAL PAYMENT OR REQUISITION: Contractor's certified request for payment for completed portions of the Work and, if the Contract so provides, for materials or equipment suitably stored pending their incorporation into the Work.
- **1.5 ARCHITECT OR ENGINEER:** A sole proprietor, partnership, firm, corporation or other business organization under Contract with the Owner, commissioned to prepare Contract Drawings and Specifications, to advise the Owner and in certain cases, to perform regular inspections during construction and when authorized to perform the duties of the Construction Administrator.
- **1.6 AS-BUILT DRAWINGS:** Construction Drawings revised by the Contractor to show all significant Modifications made during the construction process.
- **1.7 BASE BID:** Monetary value stated in the Bid Proposal Form as the sum for which the Bidder offers to perform the Work described in the Bidding Documents, exclusive of adjustments for Supplemental Bids.
- **1.8 BID BOND:** Form of Bid Security executed by the Bidder as Principal and by a Surety to guarantee that the Bidder will enter into a Contract within a specified time and furnish any required bond as mandated by Connecticut General Statute Section 4b-92.
- **1.9 BIDDER:** A sole proprietor, partnership, firm, corporation or other business organization submitting a Bid on the Bid Proposal Form for the Work contemplated.
- **1.10 BIDDING DOCUMENTS:** Collectively, the Bidding Requirements and the proposed Contract Documents, including any addenda issued prior to receipt of Bids.
- **1.11 BID OR BID PROPOSAL FORM:** A complete and duly signed proposal to perform Work (or a designated portion thereof) for a stipulated sum submitted in accordance with the Bidding Documents.

- **1.12 BID SECURITY:** Certified check or Bid Bond submitted with Bid Proposal Form, which provides that the Bidder, if awarded the Contract, will execute such Contract in accordance with the requirements of the Bidding Documents.
- **1.13 BUILDER'S RISK INSURANCE:** A specialized form of property insurance which provides coverage for loss or damage to the Work pursuant to the Contract Documents.
- **1.14 CASH ALLOWANCE:** An amount established in the Contract Documents for inclusion in the Contract Sum to cover the cost of prescribed items not specified in detail, and as shown in the Allowance Schedule.
- **1.15 CERTIFICATE OF ACCEPTANCE:** A document issued by the Owner to the Contractor stating that all Work specified in the Certificate of Acceptance has been completed and accepted by the Owner.
- **1.16 CERTIFICATE OF COMPLIANCE:** A document stating that for the portion of the Project completed, either the design portion or the construction portion, has been performed in substantial compliance with all applicable building codes.
- **1.17 CERTIFICATE OF OCCUPANCY:** Document is-sued by the authority having jurisdiction certifying that all or a designated portion of a building is approved for its designated use
- **1.18 CERTIFICATE OF SUBSTANTIAL COMPLE-TION:** A document prepared by the Architect or Engineer and approved by the Owner on the basis of an inspection stating:
  - **1.18.1** that the Work, or a designated portion thereof, is determined to be Substantially Complete;
  - 1.18.2 the date of Substantial Completion;
  - **1.18.3** the responsibilities of the Owner and the Contractor for security maintenance, heat, utilities, damage to the Work and insurance; and
  - **1.18.4** the time within which the Contractor shall complete the remaining Work.
- **1.19 CHANGE ORDER:** Written authorization signed by the Owner, authorizing a modification in the Work, an adjustment in the Contract Sum, or an adjustment in the Con-tract Time.
- **1.20 COMMISSIONER:** The State of Connecticut, Department of Construction Services (CT DCS) Commissioner acting directly or through specifically authorized CT DCS personnel or agent(s) having authority to perform duties defined in Article 25.
- **1.21 COMMISSIONING AGENT (CxA):** An independent entity under contract directly with the Owner or Owner's Representative responsible for performing the specified commissioning procedures.
- **1.22 CONSTRUCTION ADMINISTRATOR:** A sole proprietor, partnership, firm, corporation or other business organization, under Contract or employed by the Owner commissioned and/or authorized to oversee the fulfillment of all requirements

- of the Contract Documents. The authorized Construction Administrator may be a Department of Construction Services Assistant Project Manager, Department of Construction Services Project Manager, a Clerk of the Works, an Architect, a Consulting Architect, a Consulting Construction Administrator, a Consulting Engineer etc. or any other designee as authorized and identified by the Owner.
- **1.23 CONSTRUCTION CHANGE DIRECTIVE:** A written authorization signed by the Owner, directing a modification in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum, Contract Time or both. Any Construction Change Directive effecting an adjustment to the Contract Sum or Contract Time shall result in a Change Order.
- **1.24 CONTRACT DOCUMENTS OR CONTRACT:** The Agreement between Owner and Contractor, Conditions of the Contract (General Conditions, Supplementary Conditions, General Requirements and other Conditions), Drawings, Specifications, and Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract, all of which shall constitute the Contract.
- **1.25 CONTRACTOR OR GENERAL CONTRACTOR:** A sole proprietor, partnership, firm or Corporation, under direct Contract with the Department of Construction Services, responsible for performing the Work under the Contract Documents. Whenever the words "Contractor" or "General Contractor" are used it shall be understood to mean Contractor.
- **1.26 CONTRACTOR'S LIABILITY INSURANCE:** Insurance purchased and maintained by the Contractor that insures the Contractor for claims for property damage, bodily injury or death.
- **1.27 CONTRACT START DATE OR DATE OF COMMENCEMENT OF THE WORK:** The date, specified by the Owner in the Notice to Proceed, on which the Contractor is required to start the Work.
- **1.28 CONTRACT SUM:** The sum stated in the Contract, which is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.
- **1.29 CONTRACT TIME:** The period of time allotted in the Contract Documents for Substantial Completion of the Work, including authorized adjustments thereto. The Contract Time is the sum of all Working Days and Non-Working Days as further defined herein and specified in the Contract Documents.
- **1.30 DAY:** Whenever the word Day is used it shall be understood to mean calendar day stated on the Bidding Documents, unless stated otherwise.
- 1.31 DEPARTMENT OF CONSTRUCTION SERVICES (CT DCS) PROJECT MANAGER: The individual employed by the Owner, designated and authorized by the Commissioner, to be

- responsible for the overall management and oversight of the Project, and to represent the (User) Agency.
- **1.32 DIESEL VEHICLE EMMISSIONS CONTROL:** The reduction of air pollution emissions from diesel powered vehicles through the use of diesel engine emission control technologies.
- 1.33 EQUAL(S): Any deviation from the Specification which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is recognized and accepted as substantially equal to the first listed manufacturer or first listed procedure specified after review by the Architect/Engineer, and may be rejected or approved at the sole discretion of the Owner. All equals must be substantially equivalent to the first manufacturer or first procedure listed in the Specifications with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability, and suitability for purposes intended; size, rating, and cost. The equal does not constitute a modification in the scope of Work, the Schedule, or Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.
- **1.34 FINAL INSPECTION:** Review of the Work by the Architect or Engineer and Owner to determine whether Acceptance has been achieved.
- **1.35 FINAL PAYMENT:** The last payment made by the Owner to the Contractor, made after notice of the Acceptance. Payment shall include the entire unpaid balance of the Contract Sum as adjusted by modifications.
- **1.36 GENERAL CONDITIONS:** The General Conditions of the Contract for Construction, part of Division 00 of the Specifications.
- **1.37 GENERAL REQUIREMENTS:** That part of the Contract Documents entitled General Requirements, which is Division 01 of the Specifications.
- 1.38 GUARANTEE: See Warranty.
- **1.39 LIQUIDATED DAMAGES:** A sum established in a Contract, usually as a fixed sum per Day, as the predetermined measure of damages to be paid to the Owner due to the Contractor's failure to complete the Work within the Contract Time.
- **1.40 LUMP SUM:** An item or category priced as a whole rather than broken down into its elements.
- **1.41 MOBILE SOURCE:** A source designed or constructed to move from one location to another during normal operation except portable equipment and includes, but is not limited to, automobiles, buses, trucks, tractors, earth moving equipment, hoists, cranes, aircraft, locomotives operating on rails, vessels for transportation on water, lawnmowers, and other small home appliances.
- **1.42 NON-WORKING DAYS:** All Saturdays, Sundays, Legal State Holidays (12), and any other Days identified in the

Contract Documents that the Contractor is not permitted to execute the Work. The restriction of Non-Working Days may be suspended upon the approval or direction of the Commissioner.

- **1.43 NOTICE TO BIDDER:** A notice contained in the Bidding Document informing prospective Bidders of the opportunity to submit Bids on a Project.
- **1.44 NOTICE TO PROCEED:** Written notice, issued by the Commissioner or the Commissioner's authorized representative, to the Contractor authorizing the Contractor to proceed with the Work and establishing the date for commencement of the Contract Time.
- **1.45 OWNER OR DEPARTMENT:** The State of Connecticut, Department of Construction Services acting through its Commissioner or specifically authorized Department personnel or agent.
- **1.46 OVERHEAD:** Indirect costs including: supervision (any position over the foreman), field and home office expense, insurance, and small tools and consumables.
- **1.47 PAYMENT, BOND, LABOR BOND OR MATERIAL BOND:** A bond in which the Contractor and the Contractor's surety guarantee to the Owner that the Contractor will pay for labor and materials furnished for use in the performance of the Contract, as required by Connecticut General Statutes Section 49-41.
- **1.48 PERFORMANCE BOND OR SURETY BOND:** A bond in which the Contractor and the Contractor's surety guarantee to the Owner that the Work will be performed in accordance with the Contract Documents, as required by Connecticut General Statutes Section 49-41.
- **1.49 PERFORMANCE SPECIFICATION:** A description of the desired results or performance of a product, material, assembly, procedure, or a piece of equipment with criteria for identifying the standard.
- **1.50 PLANS OR DRAWINGS:** All Drawings or reproductions of Drawings pertaining to the construction of the Work contemplated and its appurtenances.
- **1.51 PROJECT:** The total construction of which the Work performed under the Contract Documents may be the whole or a part.
- **1.52 PROJECT MANUAL:** The set of documents assembled for the Work which includes, but is not limited to, Contract Documents, Bidding Requirements, Sample Forms, General Conditions of the Contract for Construction, General Requirements, and the Specifications.
- **1.53 PROPRIETARY SPECIFICATION:** A specification that describes a product, procedure, function, material, assembly, or piece of equipment by trade name and/or by naming the manufacturer(s) or manufacturer's procedure, exact model number, item, etc., of those products acceptable to the Owner.

- **1.54 RETAINAGE:** A percentage of each Application for Payment and a percentage of the total Contract Sum retained by the Owner.
- **1.55 SCHEDULE:** A Critical Path Method (CPM) or Construction Schedule as required by the Contract Documents which shall be a diagram, graph or other pictorial or written Schedule showing all events expected to occur and operations to be performed and indicating the Contract Time, start dates, durations and finish dates as well as Substantial Completion and Acceptance of the Work, rendered in a form permitting determination of the optimum sequence and duration of each operation.
- **1.56 SCHEDULE OF VALUES:** A document furnished by the Contractor to the Architect or Engineer and Owner stating the portions of the Contract Sum allocated to the various portions of the Work, which is to be used for reviewing the Contractor's Applications for Payment.
- **1.57 SECONDARY SUBCONTRACTOR:** A sole proprietor, partnership, firm or Corporation under direct Contract with the Subcontractor to the General Contractor.
- **1.58 SENSITIVE RECEPTOR SITES:** Areas where concentrations of diesel emissions may be harmful to sensitive populations, including, but not limited to, hospitals, school and university buildings being occupied during a student semester, residential structures, daycare facilities, elderly housing, and convalescent facilities.
- **1.59 SHOP DRAWINGS:** Drawings provided to Architect or Engineer and Owner by a Contractor that illustrate construction, materials, dimensions, installation, and other pertinent information for the incorporation of an element or item into the construction as detailed Contract Documents.
- **1.60 SPECIFICATIONS:** The description, provisions and other requirements pertaining to the method and manner of performing the Work and/or to the quantities and quality of materials to be furnished under the Contract.
- **1.61 SUBCONTRACTOR:** A sole proprietor, partnership, corporation or other business organization under direct Contract with the Contractor supplying labor and/or materials for the Work at the site of the Project.
- **1.62 SUBMITTALS:** Documents including, but not limited to, samples, manufacturer's data, Shop Drawing, or other such items submitted to the Owner and Architect or Engineer by the Contractor for the purpose of approval or other action, as required by the Contract Documents.
- **1.63 SUBSTANTIAL COMPLETION:** The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents.
- **1.64 SUBSTITUTION:** Any deviation from the specified requirements, which is defined as follows: A replacement for

the specified material, device, procedure, equipment, etc., which is not recognized or accepted as equal to the first manufacturer or procedure listed in the Specification after review by the Architect/Engineer, and may be rejected or approved by the Owner. The Substitution is not equal to the specified requirement in comparison to the first manufacturer or first procedure listed in the Specifications in one or more of the following areas: the substance and function considering quality, workmanship, economy of operation, durability, and suitability for purposes intended; size, cost, and rating. The Substitution constitutes a modification in the scope of Work, the Schedule, or the Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

- **1.65 SUPERINTENDENT:** The Contractor's representative at the site who is responsible for continuous field supervision, coordination, in, completion of the Work, and, unless another person is designated in writing by the Contractor to the Owner and the Construction Administrator, for the prevention of accidents.
- **1.66 SUPPLEMENTAL BID:** The monetary value stated in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted.
- **1.67 SUPPLEMENTARY CONDITIONS:** An extension in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted.
- **1.68 THRESHOLD LIMIT BUILDING:** Any proposed (new) structures or additions as defined by the Connecticut General Statutes Section 29-276b.
- **1.69 UNIT PRICE:** The monetary value stated by the Owner or the Contractor, as a price per unit of measurement for materials or services as described in the Contract Documents and/or Bidding Documents.
- **1.70 WARRANTY:** A written, legally enforceable assurance of specified quality or performance of a product or Work or of the duration of satisfactory performance.
- **1.71 WORK:** The construction and services required by the Contract Documents, and including all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

### ARTICLE 2 CONDITIONS OF WORK

2.1 The Contractor shall carefully examine and study the conditions under which the Work is to be performed and the site of the Work, and compare the Contract Documents with each other and to information furnished by the Owner including but not limited to the Plans and Specifications, the form of the Contract, General Conditions, Supplementary Conditions, General Requirements, Bonds and all other Contract Documents associated with the Work.

- 2.2 The Contractor shall report to the Construction Administrator all errors, inconsistencies or omissions discovered. The Contractor shall not be liable to the Owner for damage resulting from errors, inconsistencies or omissions in the Contract Documents unless the Contractor recognized such errors, inconsistencies or omission and failed to report it to the Construction Administrator. If the Contractor performs any actions or construction activity knowing it involves an error, inconsistency or omission in the Contract Documents without notice to the Construction Administrator, the Contractor shall assume responsibility for such performance and related costs for the correction and shall not be allowed to submit any claim related to error, inconsistencies or omission.
- 2.3 The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the Construction Administrator at once; and it will be assumed that the Contractor has been satisfied as to all requirements of the Contract Documents. Any deterrent conditions at the site of the Work which are obvious and apparent upon examination of the site but are not indicated on the Plans shall be corrected by the Contractor without additional compensation.
- 2.4 In performing the Work, the Contractor must employ such methods or means as will not cause any interruption of or interference with the Work of any other Contractor, nor any inordinate disruption with the normal routine of the Owner, institution or Agency operating at the site.
- **2.5** No claims for additional compensation will be considered when additional costs result from conditions made known to, discovered by, or which should have been discovered by, the Contractor prior to Contract signing.
- **2.6** All Communications from the Contractor concerning proposed changes to the Contract Sum, Contract Time, or Work shall be in writing.
- **2.7** The Contractor shall perform the Work in accordance with the Contract Documents and approved Submittals pursuant to Article 5.

### ARTICLE 3 CORRELATION OF CONTRACT DOCUMENTS

- **3.1** The Contract Documents are complementary, and what is called for by any one shall be as binding as if called for by all. Where discrepancies or conflict occur in the Contract Documents the following order of precedence shall be utilized:
  - **3.1.1** Amendments and addenda shall take precedence over previously issued Contract Documents.
  - **3.1.2** The Supplementary Conditions take precedence over the General Conditions.
  - **3.1.3** The General Conditions take precedence over the General Requirements.

- **3.1.4** The Specifications shall take precedence over the Plans.
- **3.1.5** Stated dimensions shall take precedence over scaled dimensions.
- **3.1.6** Large-scale detail Drawings shall take precedence over small-scale Drawings.
- **3.1.7** The Schedules contained in the Contract Documents shall take precedence over other data on the Plans.
- 3.2 Neither party to the Contract shall take advantage of any obvious error or apparent discrepancy in the Contract Documents. The Contractor shall give immediate written notification of any error or discrepancy discovered to the Construction Administrator, who shall take the necessary actions to obtain such corrections and interpretations as may be deemed necessary for the completion of the Work in a satisfactory and acceptable manner. The Contractor shall then promptly proceed under the direction of the Owner and the provisions of Article 13. The Contractor's failure to provide immediate notice shall mean the Contractor will not be entitled to any additional compensation, either monetary or Contract Time adjustment, with respect to any discrepancy.
- **3.3** Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.
- **3.4** Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings, shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.
- **3.5** Unless otherwise stated in the Contract Documents, words which have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

## ARTICLE 4 COMMENCEMENT AND PROGRESS OF WORK

- 4.1 The Work shall start upon the date given in the Notice to Proceed. The Contractor shall complete all the Work necessary for Final Payment, including but not limited to Substantial Completion, Contract close-out, testing and demonstration of all systems as required for Acceptance, punchlist Work, training and submission of Record Documents, manuals, Guarantees and Warranties as stated in the Contract Document.
- 4.2 Time is of the essence with respect to the Contract Time. By executing the Contract, the Contractor confirms and agrees that the Contract Time is a reasonable period to perform the Work. The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time. The Contractor may, at his discretion, plan to complete the Work and achieve Substantial Completion in less time than the Contract Time.

Modifications to the Work in accordance with Article 13 at any time during the Contract Time.

notwithstanding, the Owner reserves the right to order

- 4.4 The Contractor shall not be entitled to costs for delay due to Owner ordered Modifications or any other circumstances for the period of time between the Contractor's elected early completion and the end of the Contract Time. Such costs include, but are not limited to, extended home office costs, field office costs, or supervisory and management costs incurred in performance of the Work. Early completion of the Work shall not merit additional compensation.
- 4.5 If the Contractor is delayed at any time in the progress of Work by acts of God, such as fire or flood or any action, injunction or stop order issued by any court, judge or officer of the court or any other court action beyond the Owner's control, then the Contract Time may be extended by Change Order for such reasonable time as demonstrated by the Contractor's Schedule and as the Owner may determine that such event has delayed the Work. In any event, the granting of an extension of time shall be solely within the discretion of the Owner.
- **4.6** Except as otherwise may be provided herein, extensions of time shall be the Contractor's sole remedy for such delay. No payment or compensation of any kind shall be made to the Contractor for damages because of hindrance in the orderly progress of Work caused by the aforesaid causes.
- **4.7** The Contractor acknowledges that the Contract amount includes and anticipates any and all delays, whether avoidable or unavoidable, from said orders, which may issue from any court, judge, court officer, or act of God, and that such delays shall not, under any circumstances, be construed as compensable delays.
- **4.8** Any extension of the Contract Time shall be by Change Order pursuant to Article 13.
- **4.9** The Contractor shall employ a competent project manager who shall represent the Contractor. Communications given to the project manager shall be binding as if given to the Contractor. The project manager will be employed full time on the Project and be located and assigned to the Project site during and for the duration of the Work.
- **4.10** The Contractor shall employ a competent Superintendent and necessary assistants who will be in attendance at the project site during the performance of the Work.
- **4.11** Upon execution of the Contract, materials may be purchased. No material escalation costs will be valid or compensable unless the Owner directs, in writing, a delay in the procurement.

# ARTICLE 5 SUBMITTALS, PRODUCT DATA, SHOP DRAWINGS AND SAMPLES

4.3 The Contractor's early completion Schedule

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- **5.1** Contractor shall review, approve, and submit to the Construction Administrator all Submittals including but not limited to, product data, Shop Drawings, and samples, with such promptness as to cause no delay in the Work.
- **5.2** Correction or approval of such Submittals, Shop Drawings, product data and samples will be made with reasonable promptness by the Architect or Engineer. Approval will be general only and shall not relieve the Contractor from responsibility for errors in dimensions, for construction and field coordination of the Work or for any departure from the Contract Documents, unless such departure has received the Owner's written approval.
- **5.3** No Work governed by such Shop Drawings, Schedules or samples shall be fabricated, delivered or installed until approved by the Architect or Engineer.
- **5.4** No damages for delays or time extensions will be granted, even if approvals deviate from the approved Schedule.

## ARTICLE 6 SEPARATE CONTRACTS

- **6.1** The Owner reserves the right to perform Work in connection with the Contract with the Owner's own forces, or to let separate contracts relating to the Contract (Project) site or in connection with Work on adjoining sites. In such cases, the Contractor shall afford such parties reasonable opportunity for storage of materials and equipment and coordinate and connect the Work with the work on adjoining sites or other Projects, and shall fully cooperate with such parties in the matter required under Article 7 herein.
- **6.2** Contractors working in the same vicinity shall cooperate with one another and, in case of dispute, decision of the Owner shall be final and binding to all Contractors involved, including Contractors under separate Contracts.
- 6.3 The Contractor shall assume all liability, financial or otherwise, in connection with this Contract and shall protect and hold harmless the Owner from any and all damages or claims that may arise because of inconvenience or delay which the Contractor may cause other Contractors. If the Contractor experiences a loss because of the presence and operations of other Contractors working adjacent to or within the limits of the same Project, then as between the Owner and the Contractor, the Contractor shall bear such loss.
- **6.4** Insofar as possible, the Contractor shall arrange the Work and shall place and dispose of the materials being used so as not to interfere with the operations of other Contractors adjacent to or within the limits of the same Project. The Contractor shall join its Work with that of others in an acceptable manner, and perform the Work in proper accordance with that of the others.
- **6.5** In no event shall the Owner be responsible for any claim or damages that are the result of the Contractor's failure

to coordinate the Work with any other Contractor or Subcontractor.

## ARTICLE 7 COOPERATION OF TRADES

- 7.1 he Contractor shall be responsible for and shall control all activities of their Subcontractors. The Subcontractors shall consult and cooperate with one another. Each Subcontractor shall furnish all necessary information to other Subcontractors and shall lay out and install their own Work so as to avoid any delays or interference with the Work of others.
- **7.2** Any cost or changes, cutting and/or repairing, made necessary by the failure to observe the above requirements shall be borne by the party or parties responsible for such failure or neglect or their faulty Work installed.

### ARTICLE 8 DAMAGES

**8.1** The Liquidated Damages, provided in the Bidding Documents, will be assessed at two distinct times, as follows:

## 8.1.1 Liquidated Damages – Substantial Completion:

If the Contractor fails to achieve Substantial Completion of the Work by the Substantial Completion Date, and such delay is not otherwise excused under this Contract, then the Contractor agrees to pay to the Owner Liquidated Damages for the dollar amount specified in the Bid Proposal Form for this Project, for each Day beyond Substantial Completion that the Contractor fails to achieve Substantial Completion. The parties to this Contract acknowledge and agree that the actual damages that are to be anticipated as a result of the neglect, failure, or refusal of the Contractor to substantially complete the Project by the established Substantial Completion Date are uncertain in amount or extremely difficult to determine. Accordingly, the parties to this Contract do intend and in fact now agree to liquidate damages in advance and stipulate that the amount set forth in this subparagraph is reasonable and an appropriate remedy and is intended to constitute compensatory damages and does not constitute a penalty of any kind. The parties understand and agree that, by including a provision for Liquidated Damages in this Contract, or in pursuing any relief pursuant to such provision:

- .1 the parties do not intend to set a price for the privilege not to perform;
- .2 the availability of Liquidated Damages may not be relied upon as a basis for argument that the Owner has an adequate remedy at law; and
- **3** the remedies available to the Owner under this Agreement are cumulative and not exclusive.

#### 8.1.2 Liquidated Damages – Acceptance:

If the Contractor fails to complete all of the Work required for Acceptance of the Work within ninety (90) Days of Substantial Completion then the Contractor agrees to pay to the Owner Liquidated Damages for the dollar amount specified in the Bid Proposal Form for each Day in excess of ninety (90) Days beyond the Substantial Completion Date that the Contractor fails achieve Acceptance. The parties to this Contract acknowledge and agree that the actual damages that are to be anticipated as a result of the failure of the Contractor to complete all of the Work required for Acceptance within ninety (90) Days of the established Substantial Completion Date are uncertain in amount or extremely difficult to determine. Accordingly, the parties to this Contract do intend and in fact now agree to liquidate damages in advance and stipulate that the amount set forth in this subparagraph is reasonable and an appropriate remedy and is intended to constitute compensatory damages and does not constitute a penalty of any kind. The parties understand and agree that, by including a provision for Liquidated Damages in this Contract, or in pursuing any relief pursuant to such provision:

- .1 the parties do not intend to set a price for the privilege not to perform;
- .2 the availability of Liquidated Damages may not be relied upon as a basis for argument that the Owner has an adequate remedy at law; and
- .3 the remedies available to the Owner under this Agreement are cumulative and not exclusive.
- **8.2** The Liquidated Damages or any portion thereof may be waived at the sole discretion of the Commissioner.
- **8.3** No payment by the Owner, either partial or final, shall be construed to waive the Owner's right to seek Liquidated Damages.
- 8.4 In the event a court determines that the Contract herein is null and void for any reason, Contractor agrees that Contractor will not seek or pursue any lawsuit or claim for damages, including, but not limited to, claims for loss of Overhead or anticipated profits, against the Owner and the Owner shall not be liable for any damages which Contractor may incur as a result of such decision. In addition, if the court enjoins the Owner from entering into or proceeding with the Contract herein, the Owner shall not be liable for any damages arising out of or relating to the award of such Contract which Contractor may have incurred as a result of the injunction.

## ARTICLE 9 MINIMUM WAGE RATES

**9.1** In accordance with the provisions of the Connecticut General Statutes Section 31-53, the following applies:

"The wages paid on an hourly basis to any person performing the work of any mechanic, laborer, or worker on the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such person to any employee welfare fund, as defined in subsection (h) of this section, shall be at a rate equal to the rate customary or prevailing for the same work in the same trade or occupation in the town in which such public works project is being constructed. Any contractor who is not obligated by agreement

to make payment or contribution on behalf of such persons to any such employee welfare fund shall pay to each mechanic, laborer or worker as part of such person's wages the amount of payment or contribution for such person's classification on each payday."

**9.2** Each Contractor who is awarded a Contract on or after October 1, 2002 shall be subject to provisions of the Connecticut General Statutes, Section 31-53 as amended by Public Act 02-69, "An Act Concerning Annual Adjustments to Prevailing Wages."

No wage adjustment will be made to the Contract for any wage increase under this Article.

## ARTICLE 10 POSTING MINIMUM WAGE RATES

- **10.1** The Contractor shall post at conspicuous points on the site of the Contract a Schedule showing all determined wage rates for all trades and all authorized deductions, if any, from wages to be paid.
- **10.2** The Contractor shall provide weekly certified payrolls to the Owner for all persons working on the site.

### ARTICLE 11 CONSTRUCTION SCHEDULES

- **11.1** Unless otherwise specified in the Contract Documents, within twenty-one (21) Days from the Contract Start Date, the Contractor shall submit the following to the Owner for approval:
  - 11.1.1 A comprehensive Schedule of Submittals required by the Specifications. Said Schedule shall include Submittal dates, required approval dates and date material must be on site.
  - 11.1.2 The Contractor shall allow a minimum of 14 Days for the Owner and its agents' review of Submittals. No extension of the Contract Time shall be granted for revisions and resubmission. Further, the Contractor shall allow a minimum of eight weeks for testing and Acceptance of the Work by the Owner.
  - 11.1.3 When the Contract Documents specify a "CPM Schedule" a detailed Critical Path Method Schedule is required using software approved by the Owner and/or Construction Administrator with as many activities as necessary to make the Schedule an effective tool for planning and monitoring the progress of the Work. The Contractor shall show all pertinent activities requiring coordination between trades.
  - 11.1.4 When the Contract Documents specify a "Construction Schedule" a detailed Construction Schedule is required using software approved by the Owner as a horizontal bar chart with a separate bar for each major portion of the Work or operation to make the Schedule an effective

tool for planning and monitoring the progress of the Work.

- 11.2 Unless otherwise specified under the Contract Documents, the Contractor shall provide a monthly update of the CPM Schedule or Construction Schedule in the format required by the Owner as well as a disk of the updated Schedule and program. If, in the opinion of the Owner, the Work is falling behind Schedule, the Contractor shall submit a revised Schedule demonstrating a recovery plan to ensure Substantial Completion of the Work within the Contract Time.
- **11.3** Overtime, increased manpower, and additional shifts: If ordered by the Owner in writing, the Contractor shall work overtime, and/or add additional manpower and/or shifts:
  - **11.3.1** If the Contractor is not behind Schedule, the Owner will pay the Contractor the actual additional premium portion of the wages for overtime or additional shift work not included in the Contract price, but the Contractor shall not be entitled to Overhead and Profit.
  - **11.3.2** If the Contractor, through its sole or partial fault or neglect is behind Schedule, the Owner may order the Contractor, at the Contractor's expense, to increase its manpower or to work any overtime or additional shifts or take other action necessary to expedite the Work to meet the Project Schedule.
  - 11.3.3 If the Schedule is shown to be more than 21 Days behind in any critical activity, overtime, increase manpower and/or additional shifts shall be implemented immediately regardless of who is at fault. A disagreement over the cause of the impact will not relieve the Contractor from the obligation of complying with this Article. Once liability for the impact is determined, compensation will be determined in accordance with 11.3.1 or 11.3.2.
  - **11.3.4** The Owner reserves the right to suspend activity under Paragraph 11.3. Suspension shall be in writing and at the sole discretion of the Commissioner.
- **11.4** Requisitions for partial payment will not be processed until the Contractor has complied with this requirement.

### ARTICLE 12 PREFERENCE IN EMPLOYMENT

- 12.1 Should this Contract be for the construction or repair of any building, then in the employment of labor to perform the Work specified herein, preference shall be given to citizens of the United States, who are, and continuously for at least three (3) months prior to the date hereof, have been residents of the labor market area, as established by the State of Connecticut Labor Commissioner, in which such Work is to be done, and if no such qualified person is available, then to citizens who have continuously resided in the county in which the Work is to be performed for at least three (3) months prior to the date hereof, and then to citizens of the state who have continuously resided in the State at least three months prior to the date hereof.
- 12. Should this Contract be for a Construction Services

- Project other than for the construction, remodeling or repairing of public buildings covered by Connecticut General Statutes 31-52, then in the employment of mechanics, laborers or workmen to perform the Work specified herein, preference will be given to residents of the state who are, and continuously for at least six (6) months prior to the date hereof have been residents of this State, and if no such person is available then to residents of other states.
- 12.3 The provisions of this Article shall not apply where the state or any subdivision thereof may suffer the loss of revenue granted or to be granted from any Agency or Department of the federal government as a result of this Article or regulations related thereto.

## ARTICLE 13 COMPENSATION FOR CHANGES IN THE WORK

- 13.1 At any time, without invalidating the Contract and by a written order and without notice to the sureties, the Owner, through the Construction Administrator, may order modifications in the Work consisting of additions, deletions or other revisions. Upon request, the Contractor shall supply the Construction Administrator promptly with a detailed proposal for the same, showing quantities of and Unit Prices for the Work and that of any Subcontractor involved.
- 13.2 Modifications to the Work will be authorized by a written Change Order, or if necessary to expedite the Work, a written Construction Change Directive, issued by the Owner as provided for in Article 25. Change Orders and Construction Change Directives shall be processed in accordance with the terms of the Contract Documents. Upon receipt of the written Change Order, the Contractor shall proceed with the Work when and as directed.
- **13.3** If a Change Order makes the Work less expensive for the Contractor, the proper deductions shall be made from the Contract Sum, said deductions to be computed in accordance with the provisions listed in this Article 13.
- **13.4** The Contractor shall not be entitled to an extension of time if in the opinion of the Owner the Additional Work in conjunction with the Work can be performed without impact on the Contract Time.
- 13.5 The Contractor may request, and the Owner may grant additional Contract Time when, in the opinion of the Owner, the Contractor has demonstrated that the Additional Work cannot be performed in conjunction with the Work without impact on the original Substantial Completion and/or Acceptance (if applicable) date.
- **13.6** The amount of compensation to be paid to the Contractor for any Additional or Deleted Work that results in a Change Order shall be determined in one of the following manners:
  - 13.6.1 AMOUNT OF COMPENSATION FOR CHANGE ORDER COSTS: LABOR, EQUIPMENT, BENEFITS AND MATERIAL:

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**13.6.1.1 Unit Price:** As stated in the Contract Documents.

**13.6.1.2 Unit Price:** As subsequently agreed upon by the Contractor and Owner

13.6.1.3 Lump Sum: Agreed upon sum by the Owner and the Contractor. The Owner may rely on costs, prices, and documentation provided by the Contractor or Subcontractor in agreeing to a Lump Sum. If the Owner believes that additional information is necessary to substantiate the accuracy of the cost, the Owner reserves the right to request and receive additional information from the Contractor. The Lump Sum must be based upon the following itemized costs:

13.6.1.3.1 Labor: (Contractor's or Subcontractor's own forces) No Change Order Proposal shall be negotiated if the request is solely for the increased labor rate over those originally carried by the Contractor in its original bid. Additional foreman hours shall not be included unless additional crews are added and/or a compensable time extension is granted. Project Executive time shall not be included as a direct cost as it is part of the overhead mark-up allowed. Project manager hours shall not be included unless a compensable time extension is granted.

**13.6.1.3.2 Material:** (Actual cost to the Contractor or Subcontractor) Cost shall not be based upon list pricing unless it reflects the actual prices being paid and no discounts or other offsets are being received by the Contractor or Subcontractor. No Change Order Proposal shall be negotiated if the request is solely for the escalation of material prices over those originally carried by the Contractor in its original bid.

**13.6.1.3.3 Benefits:** (The established rates of the following benefit costs inherent to the particular labor involved):

**13.6.1.3.3.1** Workers Compensation.

**13.6.1.3.3.2** Federal Social Security.

**13.6.1.3.3.3** Connecticut Unemployment Compensation.

**13.6.1.3.3.4** Fringe Benefits.

**13.6.1.4 Rented Equipment:** (Used directly on the Work and by the Contractor's or Subcontractor's own forces).

**13.6.1.5 Owned Equipment:** (Used directly on the Work and by the Contractor's or Subcontractor's own forces). Daily rate is not to exceed 3% of the monthly rental rate as identified by a nationally recognized construction cost estimating guide or service.

#### 13.6.1.6 Small Tools:

Include items such as shovels, picks, rakes, ladders, and power tools which are expected to be utilized on a project. Trade related equipment, hand tools, and power tools normally supplied with the labor or are normally expected to be owned in the performance of the typical work for a trade are not compensable. These costs shall not be approved as part of the Direct Cost of a Change Order as they are included in the Contractor's overhead mark-up percentage.

**13.6.2 OVERHEAD AND PROFIT PERCENTAGES:** (Maximum allowable percentages applied to labor, equipment, and material)

**13.6.2.1** Contractor's mark-up for Work performed by its own forces:

Change Order Amount	Overhead and Profit
\$0 to \$ 5,000	20%
\$5,001 to \$15,000	17%
\$15,001 to \$25,000	15%
\$25,000 and greater	12%

**13.6.3 OVERHEAD AND PROFIT PERCENTAGES:** (Maximum allowable percentages applied to labor, equipment, benefits and material)

**13.6.3.1** Contractor's mark-up for Work performed by its Subcontractor's forces and not allowable for any subsidiary in which the Contractor has a majority ownership:

Change Order Amount	Overhead and Profit
\$0 and greater	6%

**13.6.4 OVERHEAD AND PROFIT PERCENTAGES:** (Maximum allowable percentages applied to labor, equipment, benefits and material) Subcontractor's mark-up for Work performed by its own forces:

Change Order Amount	Overhead and Profit
\$0 to \$ 5,000	20%
\$5,001 to \$15,000	17%
\$15,001 to \$25,000	15%
\$25,000 and greater	12%

**13.6.5 OVERHEAD AND PROFIT PERCENTAGES:** (Maximum allowable percentages applied to labor, equipment, benefits and material)

**13.6.5.1** Subcontractor's mark-up for Work performed by its Secondary Subcontractor's forces. Limited to one level (tier) below the Subcontractor and not allowable for any subsidiary in which the Subcontractor has a majority ownership.

Change Order Amount	Overhead and Profit
\$0 and greater	6%

#### 13.7 BOND COSTS

13.7.1 Actual additional bonding costs associated with the value of the Change Order will be compensable only when supported by written documentation by the bonding company that the Change Order requires an increase to the original Performance, Payment, Labor or Material Bond.

**13.7.2** The Contractor shall notify the bonding company at each \$500,000 increase to the contract value as the cumulative result of change orders. A copy of the Consent of Surety must be provided to the Owner prior to the execution of any change order which exceeds each cumulative \$500,000.

**13.8** Trade discounts, rebates, and amounts received from the sales by the Contractor of surplus materials and equipment shall accrue to the Owner.

- **13.9** If the parties cannot agree upon a Lump Sum, then the Commissioner, through the Project Manager, may at the option of the Commissioner take the following action(s):
  - **13.9.1** Issue a Construction Change Directive for the Additional or Deleted Work. The amount of compensation shall be computed by the actual net costs to the Contractor determined by time and material or Unit Prices based upon the same information required in Subparagraphs 13.6.1.3.3.1 through 13.6.1.5:
    - **13.9.1.1 Labor:** (Contractor's or Subcontractor's own forces).
    - **13.9.1.2 Material:** (Used by Contractor's or Subcontractor's own forces).
    - **13.9.1.3 Benefits:** (The established rates of the following benefit costs inherent to the particular labor involved):
      - 13.9.1.3.1 Workers Compensation.
      - 13.9.1.3.2 Federal Social Security.
      - 13.9.1.3.3 Connecticut Unemployment Compensation.
      - 13.9.1.3.4 Fringe Benefits.
    - **13.9.1.4 Rented Equipment:** (Used directly on the Work and by the Contractor's or Subcontractor's own forces).
    - **13.9.1.5 Owned Equipment**: (Used directly on the Work and by the Contractor's or Subcontractor's own forces). Daily rate is not to exceed 3% of the monthly rental rate that can be identified by a nationally recognized construction cost estimating guide or service.
  - **13.9.2** Issue a Change Order adjusting the Contract Sum in the amount as determined by the Commissioner.
- **13.10** For any Change Order or Construction Change Directive the Contractor shall, when requested, promptly furnish in a form satisfactory to the Construction Administrator and the Owner a complete detailed accounting of all costs relating to the Additional Work, including but not limited to certified payrolls and copies of accounts, bills and vouchers to substantiate actual costs. Further, the Owner reserves the right to access and make copies of the Contractor's records at any time upon written request from the Commissioner.
- 13.11 Failure of the Contractor to negotiate in good faith issues of time and costs or failure to provide requested documentation within fourteen (14) Days, or a time period accepted by the Commissioner, shall constitute a waiver by the Contractor of any claim. In such cases the Owner may elect to issue a unilateral Change Order in an amount deemed to be fair and equitable by the Commissioner. The provisions hereof shall not affect the power of the Contractor to act in case of emergency, threatened injury to persons, or damage to Work on any adjoining property. In this case the Commissioner, through the Project Manager, shall issue a Change Order for such amount as the Commissioner finds to be reasonable cost of such Work.

### ARTICLE 14 DELETED WORK

- **14.1** Without invalidating any of the terms of the Contract, the Commissioner may order deleted from the Contract any items or portions of the Work deemed necessary by the Commissioner.
- **14.2** The compensation to be deducted from the Contract Sum for such deletions shall be determined in the manner provided for under the provisions of Article 13 or in the event none of the provisions of Article 13 are applicable then by the value as estimated by the Owner.

## ARTICLE 15 MATERIALS: STANDARDS

- **15.1** Unless otherwise specifically provided for in the Specifications, all equipment, materials and articles incorporated in the Work are to be new and of the best grade of their respective kinds for the purposes. Wherever in the Contract Documents a particular brand, make of material, device, or equipment is shown or specified, the first manufacturer listed in the specification section is to be regarded as the standard. When the specification is proprietary and only one manufacturer is listed, the Contractor shall use the named manufacturer and no Substitutions or Equals will be allowed.
- **15.2** Any other brand, make of material, device, equipment, procedure, etc. which is a deviation from the specified requirement is prohibited from use, but may be considered by the Owner for approval as an Equal or Substitution. The Contractor is to adhere to the specific requirements of the Contract Documents. Substitutions are discouraged and are only approved by the Commissioner as an exception.

#### 15.3 Submittals – Equals and Substitution Requests:

- **15.3.1** Substitution of Materials and Equipment before Bid Opening. The Owner will consider requests for Equals or Substitutions, if made prior to the receipt of the Bid. The information on all materials shall be consistent with the information herein.
  - **15.3.1.1** Statement of Variances a statement of variances must list all features of the proposed Substitution which differ from the Drawings, Specifications and/or product(s) specified and must further certify that the Substitution has no other variant features. A request will be denied if submitted without sufficient evidence.
  - **15.3.1.2** Substitution Denial any Substitution request not complying with the above requirements will be denied. Substitution request sent after the deadline established in the Notice to Bidder will be denied.
  - **15.3.1.3** An addendum shall be issued to inform all prospective Bidders of any accepted Substitution in accordance with Owner's addenda procedures.
- 15.3.2 Substitution of Materials and Equipment After Bid Opening: Subject to the Architect or Engineer's determination, if the material or equipment is Equal to the

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one specified or pre-qualified and the CT DCS Project Manager's approval of such determination, Substitution of Material or Equipment may be allowed after the Letter of Award is issued only:

- **15.3.2.1** If the specified or pre-qualified item is delayed by unforeseeable contingencies beyond the control of the Contractor which would cause a delay in the Project completion;
- **15.3.2.2** If any specified or pre-qualified item is found to be unusable or unavailable due to a change by the manufacturer or other circumstances; or
- **15.3.2.3** If the Contractor desires to provide a more recently developed material, equipment, or manufactured model from the same named manufacturer than the one specified or pre-qualified; or **15.3.2.4** If the specified material and/or equipment inadvertently lists only a single manufacturer.
- **15.4** Contractor shall submit each request for Equal or Substitution to the Architect or Engineer who shall review each request and make the following recommendations to the Owner:
  - **15.4.1** Acceptance or non-acceptance of the adequacy of the submission and required back-up,
  - **15.4.2** Determination of the category of the request for Substitution or Equal, and
  - **15.4.3** Overall recommendation for approval or rejection of the Substitution or Equal. The determination of the category as a Substitution may be grounds for an immediate rejection by the Owner.
- 15.5 Approval of the Owner for each Equal or Substitution shall be obtained before the Contractor proceeds with the Work. The decision of the Commissioner, in this regard, shall be final and binding on the Contractor.
- 15.6 No extension of time will be allowed for the time period required for consideration of any Substitution or Equal. No extension of time will be allowed and no responsibility will be assumed by the Owner when a Contractor submits a request for Substitution or Equal, whether such request be approved or denied, and the Contractor shall not be entitled to any claim for damages for delay.
- **15.7** If the Contractor submits any request for an Equal or a Substitution, he shall bear the burden of proof that such requested Equal or Substitution meets the requirements of the Plans and Specifications.
- **15.8** The Contractor shall purchase no materials or supplies for the Work which is subject to any chattel mortgage or which are under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that the Contractor has good title to all materials and supplies used by him in the Work.
- **15.9** All products and systems supplied to the State as a result of a purchase by a Contractor shall be certified that, to the best of the supplier's knowledge, there are no materials that are classified as hazardous materials being used within the assembly. Hazardous materials include, but are not limited

to, products such as asbestos, lead, and other materials that have proven to cause a health risk by their presence.

### ARTICLE 16 INSPECTION AND TESTS

- 16.1 The purpose of the inspections will be to assure that the Work is performed in accordance with the Contract Documents. These inspections shall include, but not be limited to, all inspections and testing as required by the Owner, and any authorities have jurisdiction.
- All material and workmanship, if not otherwise designated by the Specifications, shall be subject to inspection, examination and test by the Commissioner at any and all times during manufacture and/or construction and at any and all places where such manufacture and/or The Contract Documents construction is carried on. additionally identify the parties responsible for performing and paying for the required testing and inspections. All required tests performed in a laboratory will be obtained and paid for by the Owner, except when the tests show the Work to be defective. The Contractor shall pay for all the costs associated with re-tests and re-inspections for all tests and inspections which fail. The Owner will issue a deduct Change Order to recover said retesting costs from the Contractor. All other tests, unless otherwise specified, shall be made at the Contractor's expense. Notice of the time of all tests to be made at the site shall be given to all interested parties, including the Owner.
- **16.3** Without additional cost to the Owner, the Contractor shall promptly furnish facilities, labor and materials necessary to coordinate and perform operational tests and checkout of the Work. The Contractor shall furnish promptly all reasonable facilities, labor, and materials necessary to make all such testing safe and convenient.
- If, at any time before final payment and Acceptance of the Work, the Commissioner considers it necessary or advisable to examine of any portion of the Work already completed by removing or tearing out the same, the Contractor shall, upon request, furnish promptly all necessary facilities, labor, and materials. If such Work is found to be defective in any material respect, as determined by the Owner, because of a fault of the Contractor or any of the Contractor's Subcontractors, or if any Work shall have been covered without the approval or consent of the Commissioner (whether or not it is found to be defective), the Contractor shall be liable for testing costs and all costs of correction, including removal and/or demolition of the defective Work, including labor, material, and testing, including labor, material, re-testing or reinspecting, services of required consultants, additional supervision, the Commissioner's and the Construction Administrator's administrative costs, and other costs for services of other consultants.
- **16.5** Cost of Systems Commissioning Retesting: The cost to retest a pre-functional or functional test, if the Contractor is responsible for the deficiency, shall be the Contractor's. If the Contractor is not responsible, any cost

recovery for retesting costs shall be negotiated with the Contractor.

- 16.5.1 For a deficiency identified, not related to any pre-functional checklist or start-up fault, the following shall apply: The Commissioning Agent (CxA) and Construction Administrator will direct the retesting of the equipment once at no "charge" to the Contractor for their time. However, the Commissioning Agent's and Construction Administrator's time for additional testing will be charged to the Contractor.
- 16.5.2 The time for the Systems Commissioning Agent and Construction Administrator to direct any retesting required because a specific pre-functional checklist or start-up test item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back charged to the Contractor.
- **16.5.3** Any required retesting by any Subcontractor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.

## ARTICLE 17 ROYALTIES AND PATENTS

- 17.1 If the Contractor desires to use any design, device, material or process covered by a patent or copyright, the Contractor shall provide for such use by suitable legal agreement with the holder of said patent or copyright. The Contractor shall furnish a copy of this legal agreement to the Owner.
- 17.2 The Contractor shall indemnify and hold harmless the Owner and Construction Administrator for any costs, expenses and damage which it may be obliged to pay by reason of any infringement of a patent or a copyright, at any time during the prosecution or after the Final payment of the Work.

## ARTICLE 18 SURVEYS, PERMITS AND REGULATIONS

- **18.1** Unless otherwise provided for, the Contractor shall furnish surveys necessary for the execution of the Work. The Owner will furnish the Contractor with two base lines and a benchmark.
- **18.2** The Contractor shall obtain and pay for permits and licenses necessary for the execution of the Work and the occupancy and use of the completed Work.
- **18.3** The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations including building and fire safety codes relating to the performance of the Work.
- 18.4 If underground utilities may be involved in part of the Work the Contractor is required to request "Call-Before-You-Dig" to verify the location of underground utilities at least (3) Working Days, as further defined under Paragraph 1.71 herein, prior to the start of any excavation. The Contractor shall also notify the Owner and Agency at least (3) Working Days prior to the start of any excavation. If "Call-Before-You-Dig" fails or refuses to respond to the Contractor's request, then the Contractor shall obtain the services of a qualified

underground utility locating firm, at no additional cost to the Owner, to verify locations of underground utilities prior to the start of any excavation. The Contractor shall be held responsible for providing safety, protecting the Work and protecting workmen as necessary to perform the Work. The Contractor shall be responsible for maintaining and protecting all original utility mark-out at no additional cost to the Owner.

# ARTICLE 19 PROTECTION OF THE WORK, PERSONS AND PROPERTY

- 19.1 The Contractor shall continuously and adequately protect the Work against damage from any cause, and shall protect materials and supplies furnished by the Contractor or Subcontractors, whether or not incorporated in the Work, and shall make good any damage unless it be due directly to errors in the Contract Documents or is caused by agents or employees of the Owner.
- **19.2** To the extent required by law, by public authority, or made necessary in order to safeguard the health and welfare of the personnel or occupants of any of the state institutions, the Contractor shall adequately protect adjacent property and persons, and provide and maintain all facilities, including but not limited, to passageways, guard fences, lights, and barricades necessary for such protection.
- 19.3 The Contractor shall take all necessary precautions for the safety of employees on the Work and shall comply with applicable provisions of federal and state safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed. The Contractor shall also comply with the applicable provisions of the Associated General Contractors' "Manual of Accident Prevention in Construction", the standards of the Connecticut Labor Department and Occupational Safety and Hazard Association (OSHA).
- 19.4 The Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of employees of the State and the public, and shall post danger signs warning against any dangerous condition or hazard created by such things as protruding nails, well holes, elevator hatchways, scaffolding, window openings, excavations, tripping hazards or slipping, stairways and falling materials.
- **19.5** The Contractor shall designate a qualified and responsible on-site staff person, whose duty shall be the prevention of accidents. The name and position of the designated person shall be reported to the Owner by the Contractor at the commencement of the Contract.
- 19.6 The Contractor shall at all times protect excavations, trenches, buildings, and all items of Work from damage by rain, water from melted snow or ice, surface water run off and subsurface water usual for the vicinity at the time of operations; and provide all pumps and equipment and enclosures to insure such protection.

- **19.7** The Contractor shall construct and maintain all necessary temporary drainage and provide all pumping necessary to keep excavation, basements, footings and foundations free of water.
- **19.8** The Contractor shall remove all snow and ice as may be required for access to the site and proper protection and prosecution of the Work.
- **19.9** The Contractor shall install bracing, shoring, sheathing, sheet piling, caissons and any other underground facilities as required for safety and proper execution of the Work, and shall remove this portion of the Work when no longer necessary.
- **19.10** During cold weather the Contractor shall protect all Work from damage. If low temperature makes it impossible to continue operations safely in spite of cold weather precautions, the Contractor may cease Work upon the written approval of the Commissioner.

## ARTICLE 20 TEMPORARY UTILITIES

**20.1** Unless expressly provided for otherwise in the Contract Documents, the Contractor shall include in the proposed contract bid price as stated on the Bid Proposal Form, the costs of all temporary utilities required for Project completion and protection of the Work. Said temporary utilities include, but are not limited to, lighting, heating, cooling, electrical power, water, telephone, sanitary facilities, and potable water.

## ARTICLE 21 CORRECTION OF WORK

- 21.1 The Contractor shall promptly and without expense to the Owner remove from the premises all materials rejected by or unacceptable to the Commissioner as failing to conform to the Contract Documents, whether incorporated in the Work or not.
- 21.2 The Contractor shall promptly and without expense to the Owner replace any such materials, which do not conform to the Contract Documents, and shall bear the expense of making good all Work of other Contractors or Subcontractors destroyed or damaged by such removal or replacement.
- **21.3** If the Contractor, after receipt of notice from the Owner, shall fail to remove such rejected or unacceptable materials within a reasonable time as fixed in said notice, the Owner may remove and store such materials at the expense of the Contractor.
- 21.4 Such action shall not affect the obligation of the Contractor to replace and complete assembly and installation of the Work and to bear the expenses referred to above. Prior to the correction of rejected or unacceptable Work or if the Commissioner deems it inexpedient or undesirable to correct any portion of the Work which was rejected, deemed unacceptable, or not done in accordance with the Contract

Documents, the Contract Sum shall be reduced by such amount as, in the judgment of the Commissioner, shall be equitable.

- 21.5 No extension of time will be given to the Contractor for correction of rejected or unacceptable Work. All significant punchlist Work shall be completed before Substantial Completion is determined. The remaining minor punchlist Work, as determined by the Commissioner, shall be completed within ninety (90) Days of established Substantial Completion date.
- **21.6** Final Payment shall not relieve the Contractor of responsibility for the defects in material or workmanship.
- 21.7 Unless expressly provided for otherwise in the Contract Documents, the Contractor shall remedy any rejected or unacceptable Work, and any Work found to be not conforming to the Contract Documents which is discovered within 18 Months after the date of Substantial Completion. The Contractor shall pay for any damage to other Work caused by such nonconforming Work or any damage created in correcting the nonconforming Work.

## ARTICLE 22 GUARANTEES and WARRANTIES

- **22.1** Unless expressly provided for otherwise in the Contract Documents, the Contractor shall provide a Warranty on the Work for an 18-Month period from the date of Substantial Completion. The Contractor shall warrant that the equipment, materials and workmanship are of good quality and new, unless permitted elsewhere by the Contract Documents, and that the Work shall be free from defects not inherent in the quality required or permitted and that the Work conforms to the Contract Documents.
- **22.2** Disclaimers and limitations from manufactures, Subcontractors, suppliers or installers to the Contractor shall not relieve the Contractor of the Warranty on the Work. The Contract Documents detail the related damages, reinstatement of Warranty, replacement cost and Owner's recourse.

## ARTICLE 23 CUTTING, FITTING, PATCHING, AND DIGGING

- **23.1** The Contractor will perform or will cause the Subcontractors to perform all cutting, fitting, or patching of the portion(s) of the Work that may be required to make the several parts thereof joined and coordinated in a manner satisfactory to the Commissioner and in accordance with the Plans and Specifications.
- 23.2 The responsibility for defective or ill-timed Work shall be with the Contractor, but such responsibility shall not in any way relieve the Subcontractor who performed such Work. Except with the consent of the Commissioner, neither the Contractor nor any of its Subcontractors shall cut or alter the Work of any other Contractor or Subcontractor.

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#### ARTICLE 24 CLEANING UP

- **24.1** The Contractor shall, on a daily basis, keep the premises free from accumulations of waste material or rubbish.
- 24.2 Prior to Acceptance of the Work, the Contractor shall remove from and about the site of the Work, all rubbish, all temporary structures, tools, scaffolding, and surplus materials, supplies, and equipment which may have been used in the performance of the Work. If the Commissioner in his sole discretion determines that the Contractor has failed to clean the work site, the Owner may remove the rubbish and charge the cost of such removal to the Contractor. A deduct Change Order will be issued by the Owner to recover such cost.

## ARTICLE 25 ALL WORK SUBJECT TO CONTROL OF THE COMMISSIONER

- 25.1 The Commissioner hereby declares that the CT DCS Project Manager is the Commissioner's only authorized representative to act in matters involving the Owner's, and/or Architect's or Engineer's, ability to revoke, alter, enlarge or relax any requirement of the Contract Documents; to settle disputes between the Contractor and the Construction Administrator; and act on behalf of the Commissioner. In all such matters, the provisions of Articles 13 and 14 herein shall guide the CT DCS Project Manager.
- 25.2 In no event may the Contractor act on any instruction of the Agency without written consent of the Owner. In the event the Contractor acts without such consent, he does so at his own risk and at his own expense, not only for the Work performed, but for the removal of such Work as determined necessary by the Commissioner.
- **25.3** In the performance of the Work, The Contractor shall abide by all orders, directions, and requirements of the Commissioner at such time and places and by such methods and in such manner and sequence as the Commissioner may require.
- **25.4** The Commissioner shall determine the amount, quality, acceptability and fitness of all parts of the Work, shall interpret the plans, Specifications, Contract Documents and extra work orders and shall decide all other questions in connection with the Work.
- 25.5 The Contractor shall employ no plant, equipment, materials, methods, or persons to which the Commissioner objects and shall remove no plant materials, equipment, or other facilities from the site of the Work without the permission of the Commissioner. Upon request, the Commissioner shall confirm in writing any oral order, direction, requirement or determination.
- **25.6** In accordance with Section 4b-24 of the Connecticut General Statutes, the public auditors of the State of Connecticut and the auditors or accountants of the

Commissioner of Construction Services shall have the right to audit and make copies *of* the books of any Contractor employed by the Commissioner.

## ARTICLE 26 AUTHORITY OF THE CONSTRUCTION ADMINISTRATOR

- **26.1** The Construction Administrator employed by the Commissioner is authorized to inspect all Work for conformance to the Contract Documents. The Construction Administrator is authorized to reject all Work found to be defective, unacceptable and nonconforming to the Contract Documents. Such inspections and rejections may extend to all or any part of the Work, and to the preparation or manufacture of the material to be used.
- 26.2 The Construction Administrator is not empowered to revoke, alter, enlarge, or relax any requirements of the Contract Documents, or to issue instructions contrary to the Contract Documents. The Construction Administrator shall in no case act as foreman or perform other duties for the Contractor, nor shall the Construction Administrator interfere with the management of the Work by the Contractor. Any advice, which the Construction Administrator may give the Contractor, shall in no way be construed as binding the Commissioner or Owner in any way, nor releasing the Contractor from the fulfillment of the terms of the Contract.
- **26.3** In any dispute arising between the Contractor and the Construction Administrator with reference to inspection and rejection of the Work, the Construction Administrator may suspend Work on the non-compliant portion of the Work until the dispute can be referred to and decided by the Commissioner.

## ARTICLE 27 SCHEDULE OF VALUES, APPLICATION FOR PAYMENT

- 27.1 Immediately after the signing of the Contract, the Contractor shall furnish for the use of the Commissioner, as a basis for estimating partial payments, a certified Schedule of Values, totaling the Contract Sum and broken down into quantities and unit costs, as outlined in the Contract Documents and as directed by the Owner. The Schedule of Values must reflect true costs and be in sufficient detail to be an effective tool for monitoring the progress of the Work Upon request of the Commissioner; the Contractor shall supply copies of signed Contracts, vendor quotations, etc. as back up to the Schedule of Values.
- **27.2** Approval of the Schedule of Values by the Commissioner is required prior to any payment by the Owner.
- **27.3** The Schedule of Values shall include a breakdown of the Contractor's general condition costs.
- **27.3.1** Non-recurring costs, (i.e. Mobilization costs, utility hook-ups, temporary heat) will be paid at the time of occurrence.

- **27.3.2** Reoccurring costs will be paid in proportion to the percent of completion of the Project.
- **27.3.3** Further detail can be found in the General Requirements 01.29.76; paragraphs 1.3.B.4 for this project.
- **27.4** The Schedule of Values shall include a breakdown of Contract closeout costs including systems certification testing and acceptance, training, Warranties, Guarantees, As-Built Drawings and attic stock.
- **27.5** The Contractor shall make periodic applications for payment, which shall be subdivided into categories corresponding with the approved Schedule of Values and shall be in such numbers of copies as may be designated by the Commissioner.

## ARTICLE 28 PARTIAL PAYMENTS

- **28.1** Commissioner will examine the Contractor's Applications For Payments to determine, in the opinion of the Commissioner, the amounts that properly represent the value of the Work completed and the materials suitably stored on the site.
- **28.2** In making such Application For Payment for the Work, there shall be deducted <u>seven</u> and <u>one-half</u> percent (7.5%) of the amount of each Application for Payment to be retained by the Owner as Retainage until Final Completion.
  - The Commissioner has the sole discretion in 28.2.1 the determination of reduction in Retainage. At fifty percent (50%) completion of the Work the Owner shall issue a "Contractor's Performance Evaluation". If the Contractor receives a performance evaluation score of "Good" or better, then the Retainage withheld may be reduced to five percent (5%). All subsequent Applications for Payment shall be subject to five percent (5%) Retainage. Upon Substantial Completion, the Retainage may be reduced at the request of the Contractor and recommendation of the CT DCS Project Manager. In the event of a reduction in Retainage to below five percent (5%), the minimum Retainage withheld shall not be less than the CT DCS Project Manager's estimate of the remaining Work or two and one-half percent (2.5%), which ever is greater. All requests for Retainage Reduction shall be done on CT DCS Form 7048 General Contractor Retainage Reduction Request, which can be found at the end of the General Conditions.
  - **28.2.2** Subsequent to Substantial Completion, in limited circumstances, at the sole discretion of the Commissioner, a reduction of Retainage below Two and one-half percent (2.5%) may be considered.
  - **28.2.3** A "Good" Contractor's Performance Evaluation score shall be defined as a minimum total score of sixty percent (60%).
- **28.3** The decision of the Commissioner to reduce the Retainage rate will be based upon the Contractor's Performance Evaluation score for completed portions of the

- Work as set out above and other factors that the Commissioner may find appropriate as follows:
  - **28.3.1** The Contractor's timely submission of an appropriate and complete CPM Schedule or Construction Schedule and Schedule of Values, in compliance with the Contract requirements and the prompt resolution of the Owner's and/or Architect's or Engineer's comments on the submitted material resulting in an appropriate basis for progress of the Work.
  - **28.3.2** The Contractor's timely and proper submission of all Contract Document required submissions: including, but not limited to, Shop Drawings, material certificates and material samples and the prompt resolution of the Owners and/or Architect's or Engineer's comments on the submitted material, resulting in an appropriate progress of the Work.
  - **28.3.3** The Contractor's provision of proper and adequate supervision and home office support of the Project.
  - **28.3.4** The Work completed to date has been installed or finished in a manner acceptable to the Owner.
  - **28.3.5** The progress of the Work is consistent with the approved CPM Schedule or Construction Schedule.
  - **28.3.6** All approved credit change orders have been invoiced.
  - **28.3.7** All Change Order requests for pricing are current.
  - **28.3.8** The Contractor has and is maintaining a clean worksite in accordance with the Contract Documents.
  - **28.3.9** All Subcontractor payments are current at the time of reduction request.
  - **28.3.10** Contractor is compliant with set-aside provisions of the contract.
  - 28.3.2.11 Pursuant to C.G.S. Sec. 4a-101, the General Contractor shall compile evaluation information during the performance of the contract on each of its subcontractors who are performing work with a value in excess of five hundred thousand dollars (\$500,000.00). The General Contractor shall complete and submit to the State of Connecticut Department of Construction Services (CT DCS) evaluations of each such subcontractor upon fifty percent (50%) completion of the project and upon Substantial Completion of the project. The General Contractor acknowledges that its failure to complete and submit these evaluations in a timely manner may, by statute; result in a delay in project funding and, consequently, payment to the General Contractor.
- **28.4** No payments will be made for improperly stored or protected materials or unacceptable Work.
- **28.5** At his or her sole discretion, the Commissioner may allow to be included in the monthly requisitions payment requests for materials and equipment stored off the site.
  - **28.5.1** In the event the Commissioner allows the Contractor to include in its requisitions payment requests for materials and equipment stored off the site, the Contractor shall also submit any additional bonds and/or insurance certificates relating to off-site stored materials

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and equipment, and follow such other procedures as may be required by the State to obtain the Commissioner's approval of such requests.

**28.5.2** The Architect or Engineer, or Construction Administrator shall have inspected said materials and equipment and recommended payment therefore. The Contractor shall pay for the cost of the Architect's or Engineer's, or Construction Administrator's time and expense in performing these inspection services.

# ARTICLE 29 DELIVERY OF STATEMENT SHOWING AMOUNTS DUE FOR WAGES, MATERIALS, AND SUPPLIES

- 29.1 For each Application for Payment under this Contract, the Owner reserves the right to require the Contractor and every Subcontractor to submit a written verified statement, in a form satisfactory to the Owner, showing in detail all amounts then due and unpaid by such Contractor or Subcontractor for daily or weekly wages to all laborers employed by it for the performance of the Work or to other persons for materials, equipment or supplies delivered at the site.
- **29.2** The term "laborers" as used herein shall include workmen, workwomen, and mechanics.
- **29.3** Failure to comply with this requirement may result in the Owner withholding the Application for Payment pursuant to Article 28.

## ARTICLE 30 SUBSTANTIAL COMPLETION AND ACCEPTANCE

#### 30.1 Substantial Completion:

- **30.1.1** When the Contractor considers that the Work or a portion thereof is Substantially Complete, the Contractor shall request an inspection of said Work in writing to the Construction Administrator. The request shall certify that the Contractor has completed its own inspection prior to the request and that the Contractor is compliant with all requirements of Section 01 77 00 of the General Requirements. The request must also include a statement that a principal or senior executive of the Contractor is ready, willing and able to attend a walk through inspection with the Architect or Engineer.
- **30.1.2** Upon receipt of the request, the Architect or Engineer, Construction Administrator and Owner, will make an inspection to determine if the Work or designated portion thereof is Substantially Complete. A principal or senior executive of the Contractor shall accompany the Architect or Engineer during each inspection/re-inspection. If the inspection discloses any item, whether or not included on the inspection list, which is not in accordance with the requirements of the Contract Documents, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item.
- **30.1.3** The Contractor shall then submit a request for another inspection. The determination of Substantial Completion is solely within the discretion of the Owner. Any

costs for re-inspection beyond one, shall be at the expense of the Contractor and such costs will be recovered by issuance of a credit Change Order. When the Work or designated portion thereof is determined to be Substantially Complete, the Contractor will be provided a Certificate of Substantial Completion from the Owner. The Certificate of Substantial Completion shall establish the date when the responsibilities of the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance, are transferred to the Owner and shall fix the time within which the Contractor shall finish all items on the inspection list accompanying the Certificate. If the punch list is not complete in 90 Days, the Owner reserves the right to complete the outstanding punch list items with their own forces or by awarding separate contracts and to deduct the cost thereof from the amounts remaining due to the Contractor.

**30.1.4** The Certificate of Substantial Completion shall be signed by the Construction Administrator, Owner, and Architect or Engineer. Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Construction Administrator and Architect or Engineer, the Owner shall make payment reflecting adjustment in Retainage, if any, for such Work or portion thereof as provided in the Contract Documents.

#### 30.2 Acceptance:

- **30.2.1** Upon completion of the Work, the Contractor shall forward to the Construction Administrator a written notice that the Work is ready for inspection and Acceptance.
- **30.2.2** When the Work has been completed in accordance with terms and conditions of the Contract Document as determined by the Owner a Certificate of Acceptance shall be issued by the Owner.

#### ARTICLE 31 FINAL PAYMENT

- **31.1** The Owner reserves the right to retain for a period of thirty (30) Days after filing of the Certificate of Acceptance the amount therein stated less all prior payments and advances whatsoever to or for the account of the Contractor.
- **31.2** All prior estimates and payments, including those relating to extra or additional Work, shall be subject to correction by the Final Payment.
- **31.3** No Application for Payment, Final or Partial, shall act as a release to the Contractor or the Contractor's sureties from any obligations under this Contract.
- **31.4** The Architect or Engineer and Construction Administrator will promptly issue the Certificate for Payment, stating that to the best of their knowledge, information and belief, and on the basis of their observations and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in said Final Payment is due and payable.

- **31.5** Final Payment shall not be released until a Certificate of Acceptance and a Certificate of Compliance have been issued.
- **31.6** Neither Final Payment nor any Retainage shall become due until the Contractor submits to the Owner the following:
  - **31.6.1** An affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied.
  - **31.6.2** A certificate evidencing that insurance required by the Contract Documents to remain in force after Final Payment is currently in effect and will not be canceled or allowed to expire without at least 30 Days prior written notice to the Owner.
  - **31.6.3** A written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents.
  - **31.6.4** Written consent of surety, if any, to Final Payment.
  - 31.6.5 If required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

## ARTICLE 32 OWNER'S RIGHT TO WITHHOLD PAYMENTS

- **32.1** The Commissioner may withhold a portion of any Payment due the Contractor that may, in the judgment of the Commissioner, be necessary:
  - **32.1.1** To assure the payment of just claims then due and unpaid to any persons supplying labor or materials for the Work.
  - **32.1.2** To protect Owner from loss due to defective, unacceptable or non-conforming Work not remedied by the Contractor.
  - **32.1** To protect the Owner from loss due to injury to persons or damage to the Work or property of other Contractors, Subcontractors, or others caused by the act or neglect of the Contractor or any of its Subcontractors.
- **32.2** The Owner shall have the right to apply any amount withheld under this Article as the Owner may deem proper to satisfy protection from claims. The amount withheld shall be considered a payment to the Contractor.
- **32.3** The Owner has the right to withhold payment if the Contractor fails to provide accurate submissions of Submittals,

- up date the status including but not limited to the following: As-Built Drawings, request for information (RFI) log, Schedule, submittal log, Change Order log, certified payrolls and daily reports and all other requirement of the Contract Documents.
- **32.4** If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorney's fees.

## ARTICLE 33 OWNER'S RIGHT TO STOP WORK OR TERMINATE CONTRACT

- **33.1** The Commissioner shall have the authority to suspend the Work wholly or in part, for such period or periods as the Commissioner considers being in the best interests of the State, or in the interests of public necessity, convenience or safety. During such periods the Contractor shall store all materials and equipment, in such a manner to prevent the materials and equipment from being damaged in any way, and the Contractor shall take precautions to protect the Work from damage.
- **33.1.1** If the Commissioner, in writing, orders the performance of all or any portion of the Work to be suspended or delayed for an unreasonable period of time (i.e. not originally anticipated, customary, or inherent in the construction industry) and the Contractor believes that additional compensation and/or Contract Time is due as a result of such suspension or delay, the Contractor shall submit to the Commissioner in writing a request for a Contract adjustment within 7 Days of receipt of the notice to resume Work. The request shall set forth the specific reasons and support for said adjustment.
- **33.1.2** The Commissioner shall evaluate any such requests received. If the Commissioner agrees that the cost and/or time required for the performance of the Contract has increased as a result of such suspension and that the suspension was caused by conditions beyond the control of and not the fault of the Contractor, its suppliers, or Subcontractors, and was not caused by weather, then the Commissioner will make a reasonable adjustment, excluding profit, of the Contract terms. The Commissioner will notify the Contractor of the determination as to what adjustments of the Contract, if any, that the Commissioner deems warranted.
- **33.1.3** No Contract adjustment will be made unless the Contractor has submitted the request for adjustment within the time prescribed.
- **33.1.4** No Contract adjustment will be made under this Article to the extent that performance would have been suspended or delayed by any other cause within the Contractor's control or by any factor for which the Contractor is responsible under the Contract; or that such an adjustment is provided for or excluded under other term or condition of this Contract.
- 33.2 Notwithstanding any provision or language in the

Contract to the contrary, the State may terminate the Contract whenever the Commissioner determines at his sole discretion that such termination is in the best interests of the State. Any such termination shall be effected by delivery to the Contractor of a written Notice of Termination specifying the extent to which performance of Work under the Contract is terminated, and the date upon which such termination shall be effective.

- **33.2.1** In the event of such termination, the Contractor shall be entitled to reasonable compensation as determined by the Commissioner, however, no claim for lost Overhead or profits shall be allowed.
- **33.2.2** All Work and materials obtained by the Contractor for the Work, that have been incorporated into the Work, inspected, tested as required, accepted by the Commissioner, and paid for by the State, shall become the property of the State.
- **33.2.3** Materials obtained by the Contractor for the Work that have been inspected, tested as required, and accepted by the Commissioner, and that are not incorporated into the Work, shall, at the option of the Commissioner, be purchased from the Contractor at actual cost as shown by receipted bills. To this cost shall be added all actual costs for delivery at such points of delivery as may be designated by the Commissioner, as shown by actual cost records.
- **33.2.4** Termination of the Contract shall not relieve the Contractor or its Surety of their responsibilities for the completed Work, nor shall it relieve the Contractor's Surety of its obligations to ensure completion of the Work and to pay legitimate claims arising out of Work.

## ARTICLE 34 SUBLETTING OR ASSIGNING OF CONTRACT

- **34.1** The Contract or any portion thereof, or the Work provided for therein, or the right, title, or interest of the Contractor therein may not be sublet, sold, transferred, assigned, or otherwise disposed of to any person, firm, or corporation without the written consent of the Commissioner.
- **34.2** No person, firm, or corporation other than the Contractor to whom the Contract was awarded shall be permitted to commence Work at the site of the Contract until such consent has been granted.

## ARTICLE 35 CONTRACTOR'S INSURANCE

35.1 The Contractor shall not start Work under the Contract until they have obtained insurance as stated in SECTIONS 00 62 16 CERTIFICATE OF INSURANCE and 00 40 13 BID PROPOSAL FORM, subsections 4.4.2 and 4.4.3, of the Project Manual and until the insurance has been approved by the Owner. The Contractor shall not allow any Subcontractor to start Work until the same insurance has been obtained by the Subcontractor and approved by the Owner or the Contractor's insurance provides coverage on behalf of the Subcontractor. The Contractor shall send Certificates of Liability Insurance to the Bidding and Contracts Unit, Department of Construction Services, 165 Capitol Avenue, Room G-35, Hartford, CT 06106 unless otherwise directed in

writing. Presented below is a narrative summary of the insurance required.

- **35.1.1 Commercial General Liability** Insurance including contractual liability, products/completed operations, broad form property damage and independent Contractors. The limits shall be no less than \$1,000,000 each occurrence and \$2,000,000 annual aggregate. Coverage for hazards of explosion, collapse and underground (X-C-U) and for asbestos abatement when applicable to this Contract, must also be included when applicable to the Work to be performed. The State of Connecticut, the Department of Construction Services, and their respective officers, agents, and employees shall be named as an Additional Insured. This coverage shall be provided on a primary basis.
- **35.1.2** Owner's and Contractor's Protective Liability insurance providing a total limit of \$1,000,000 for all damages arising out of bodily injury or death of persons in any one accident or occurrence and for all damages arising out of injury or destruction of property in any one accident or occurrence and subject to a total (aggregate) limit of \$2,000,000 for all damages arising out of bodily injury to or death of persons in all accidents or occurrences and out of injury to or destruction of property during the policy period. This coverage shall be for and in the name of the State of Connecticut.
- **35.1.3 Automobile Liability** The operation of all motor vehicles including those owned, non-owned and hired or used in connection with the Contract shall be covered by Automobile Liability insurance providing for a total limit of \$1,000,000 for all damages arising out of bodily injuries to or death of all persons in any one accident or occurrence and for all damages arising out of injury to or destruction of property in any one accident or occurrence. In cases where an insurance policy shows an aggregate limit as part of the automobile liability coverage, the aggregate limit must be at least \$2,000,000. This coverage shall be provided on a primary basis. Should the Contractor not own any automobiles, the automobile & liability requirement shall be amended to allow the Contractor to maintain only hired and non-owned liability coverage.
- **35.1.4** Excess Liability (Other than Umbrella Form) insurance in the amount of \$5,000,000 for bids of \$1,000,000 \$10,000,000 and in the amount of \$10,000,000 for bids of \$10,000,001 \$20,000,000. Refer to Section 00 92 00 Amendments of the Project Manual for Excess Liability insurance requirements for bids exceeding \$20,000,000.
- **35.1.5** Workers' Compensation and Employer's Liability as required by Connecticut Law and Employers' Liability with a limit of not less than \$100,000 per occurrence, \$500,000 disease policy limit and \$100,000 disease each employee. When Work is on or contiguous to navigable bodies of waterways and ways adjoining, the Contractor shall include the Federal Act endorsement for the U.S. Longshoremen's and Harbor Workers Act.

- **35.1.6 Special Hazards Insurance**, if required, will be stated in SECTION 00 40 13 BID PROPOSAL FORM, subsection 4.4.2 of this Project Manual. This includes coverage for explosion, collapse or underground damage and for asbestos abatement when applicable to this Contract and shall be no less than \$1,000,000 each occurrence.
- **35.1.7 Builder's Risk Insurance**, if required, will be stated in Section 00 40 13 Bid Proposal Form, subsection 4.4.3 of this Project Manual.
- **35.1.8 Inland Marine/Transit Insurance**: With respect to property with values in excess of \$100,000 which is rigged, hauled or situated at the site pending installation, the Contractor shall maintain inland marine/transit insurance provided the coverage is not afforded by a Builder's Risk policy.
- **35.1.9** When required to be maintained, the Builder's Risk and/or Inland Marine/Transit Insurance policy shall endorse the State of Connecticut as a Loss Payee and the policy shall state it is for the benefit of and payable to the State of Connecticut.
- 35.2 Satisfying Limits Under an Umbrella Policy: If necessary, the Contractor may satisfy the minimum limits required above for either Commercial General Liability, Automobile Liability, and Employer's Liability coverage under an Umbrella or Excess Liability policy. The underlying limits may be set at the minimum amounts required by the Umbrella or Excess Liability policy provided the combined limits meet at least the minimum limit for each required policy. The Umbrella or Excess Liability policy shall have an Annual Aggregate at a limit not less than two (2) times the highest per occurrence minimum limit required above for any of the required coverages. The State of Connecticut shall be specifically endorsed as an Additional Insured on the Umbrella or Excess Liability policy, unless the Umbrella or Excess Liability policy provides continuous coverage to the underlying policies on a complete "Follow-Form" basis.
- **35.3** The Contractor shall, at its sole expense, maintain in full force and effect at all times during the life of the Contract or the performance of Work hereunder, insurance coverage as described herein. Certificates shall include a minimum thirty (30)-day endeavor to notify requirement to the Owner prior to any cancellation or non-renewal.
- **35.4** The Contractor shall be fully and solely responsible for any costs or expenses as a result of a coverage deductible, coinsurance penalty, or self-insured retention, including any loss not covered because of the operation of such deductible, coinsurance penalty, or self-insured retention.
- **35.5** The requirement contained herein as to types and limits of insurance coverage to be maintained by the Contractor are not intended to and shall not in any manner limit or qualify the liabilities and obligations assumed by the Contractor.

Hold Harmless Provisions: The Contractor shall at all times indemnify and save harmless the State of Connecticut, the Department of Construction Services, and their respective officers, agents, and employees, on account of any and all claims, damages, losses, litigation, expenses, counsel fees and compensation arising out of injuries (including death) sustained by or alleged to have been sustained by the officers, agents, and employees of said State or Department, or of the Contractor, his Subcontractor, or materialmen and from injuries (including death) sustained by or alleged to have been sustained by the public, any or all persons on or near the Work, or by any other person or property, real or personal (including property of said State or Department) caused in whole or in part by the acts, omissions, or neglect or the Contractor including, but not limited to, any neglect in safeguarding the Work or through the use of unacceptable materials in constructing the Work of the Contractor, any Subcontractor, materialman, or anyone directly employed by them or any of them while engaged in the performance of the Contract, including the entire elapsed time from the date of the Notice to Proceed or the actual Commencement Of The Work whichever occurs first until its completion as certified by the Department of Construction Services.

### ARTICLE 36 FOREIGN MATERIALS

- **36.1** Preference shall be given to articles or materials manufactured or produced in the United States, Canada, and Mexico, (the members of the North American Free Trade Agreement (NAFTA)); and the products shall meet all of the referenced standards and Specifications for conditions of performance, quality, and price with duty being equal.
- **36.2** Only articles or materials manufactured or produced in the United States, Canada, and Mexico, (the members of the North American Free Trade Agreement (NAFTA)), will be allowed. The foregoing provisions shall not apply to foreign articles or materials required by the Contract Documents.

#### ARTICLE 37 HOURS OF WORK

- 37.1 No person shall be employed to work or be permitted to work more than eight (8) hours in any Day or more than forty (40) hours in any week for any Work provided in the Contract, in accordance with Connecticut General Statute Section 31-57.
- **37.2** The operation of such limitation of hours of work may be suspended during an emergency, upon the approval of the Commissioner, in accordance with Connecticut General Statute Section 31-57.

### ARTICLE 38 CLAIMS

**38.1 General:** When filing a formal claim under Section 4-61 (referred to as "Section 4-61" below) of the Connecticut

General Statutes (as revised), either as a lawsuit in the Superior Court or as a demand for arbitration, the Contractor must follow the procedures and comply with the requirements set forth in this Article. This Section does not, unless so specified, govern informal claims for additional compensation which the Contractor may bring before the Department. The Contractor should understand, however, that the Department may need, before the Department can resolve such a claim, the same kinds of documentation and other substantiation that it requires under this Article. It is the intent of the Department to compensate the Contractor for actual increased costs caused by or arising from acts or omissions on the part of the Department that violate legal or contractual duties owed to the Contractor by the Department.

**38.2 Notice of Claim:** Whenever the Contractor intends to file a formal claim against the Department under Section 4-61, seeking compensation for additional costs, the Contractor shall notify the Commissioner in writing (in strict compliance with Section 4-61) of the details of said claim. Such written notice shall contain all pertinent information described in Paragraph 38.5 below.

Once formal notice of a claim under Section 4-61(b) (as revised) has been given to the Commissioner, the claimant may not change the claim in any way, in either concept or monetary amount, (1) without filing a new notice of claim and demand for arbitration to reflect any such change, and (2) without the minimum period of six months after filing of the new demand commencing again and running before any hearing on the merits of the claim may be held. The only exception to this limitation will be for damages that continue to accrue after submission of the notice, in ways described and anticipated in the notice.

- **38.3 Record Keeping:** The Contractor shall keep daily records of all costs incurred in connection with its Work on behalf of the Department. The daily records shall identify each aspect of the Project affected by matters related to any claim for additional compensation that the Contractor has filed, intends to file, or has reason to believe that it may file against the Department; the specific Project locations where Project work has been so affected; the number of people working on the affected aspects of the Project at the pertinent time(s); and the types and number of pieces of equipment on the Project site at the pertinent time(s). Any potential or anticipated effect on the Project's progress or Schedule which may result in a claim by the Contractor shall be noted contemporaneously with the cause of the effect, or as soon thereafter as possible.
- **38.4** Claim Compensation: The payment of any claim, or any portion thereof, that is deemed valid by the Department shall be made in accordance with the following provisions of this Article:
- **38.4.1** Compensable Items: The liability of the Department for claims will be limited to the following specifically identified items of cost, insofar as they have not otherwise been paid for by the Department, and insofar as they were caused solely by the actions or omissions of the Department or its agents (except that with regard to payment for extra work, the Department will pay to the Contractor the Overhead and profit percentages provided for in Article 13.):

- 38.4.1.1 Additional Project-site labor expenses.
- 38.4.1.2 Additional costs for materials.
- **38.4.1.3** Additional, unabsorbed Project-site Overhead (e.g., for mobilization and demobilization).
- 38.4.1.4 Additional costs for active equipment.
- **38.4.1.5** For each Day of Project delay or suspension caused solely by actions or omissions of the Department either:
  - **38.4.1.5.1** an additional ten percent (10%) of the total amount of the costs identified in Subparagraphs 38.4.1.1 through 38.4.1.4 above; except that if the delay or suspension period prevented the Contractor from incurring enough Project costs under Subparagraphs 38.4.1.1 through 38.4.1.4 during that period to require a payment by the Department that would be greater than the payment described in Subparagraph 38.4.1.5.2 below, then the payment for affected home office Overhead and profit shall instead be made in the following *per diem* amount:
  - **38.4.1.5.2** six percent (6%) of the original total Contract amount divided by the original number of Days of Contract Time. Payment under either 38.4.1.5.1 or 38.4.1.5.2 hereof shall be deemed to be complete and mutually satisfactory compensation for any unabsorbed home office overhead and any profit related to the period of delay or suspension.
- **38.4.1.6** Additional equipment costs. Only actual equipment costs shall be used in the calculation of any compensation to be made in response to claims additional Project compensation. equipment costs shall be based upon records kept in the normal course of business and in accordance with generally accepted accounting principles. Under no circumstances shall Blue Book or other guide or rental rates be used for this purpose (unless the Contractor had to rent the equipment from an unrelated party, in which case the actual rental charges paid by the Contractor, so long as they are reasonable, shall be used). Idle equipment, for instance, shall be paid for based only on its actual cost to the Contractor.
- **38.4.1.7** Subcontractor costs limited to, and determined in accordance with, Subparagraphs 38.4.1.1 through 38.4.1.5 above and applicable statutory and case law. Such Subcontractor costs may be paid for by the Department only: (a) in the context of an informal claims settlement; or (b) if the Contractor has itself paid or legally assumed, present unconditional liability for those Subcontractor costs.
- **38.4.2 Excusable But Not Compensable Items:** The Contractor may be allowed Days but the Department will have no liability for the following non-compensable items:
  - 38.4.2.1 Abnormal or unusually severe weather
  - 38.4.2.2 Acts of God
  - 38.4.2.3 Force Majeure
  - 38.4.2.4 Concurrent Delay

**38.4.3 Non-Compensable Items:** The Department will have no liability for the following specifically-identified noncompensable items:

38.4.3.1	Profit, in excess of that provided for
herein.	

- 38.4.3.2 Loss of anticipated profit.38.4.3.3 Loss of bidding opportunities.38.4.3.4 Reduction of bidding capacity.
- **38.4.3.5** Home office overhead in excess of that provided for in Subparagraph 38.4.1.5 hereof.
- **38.4.3.6** Attorneys fees, claims preparation expenses, or other costs of claims proceedings or resolution.
- **38.4.3.7** Subcontractor failure to perform **38.4.3.8** Any other consequential or indirect expenses or costs, such as tort damages, or any other form of expense or damages not provided for in these specifications or elsewhere in the Contract.
- **38.5** Required Claim Documentation: All claims shall be submitted in writing to the Commissioner, and shall be sufficient in detail to enable the Department to ascertain the basis and the amount of each claim, and to investigate and evaluate each claim in detail. As a minimum, the Contractor must provide the following information for each and every claim and sub-claim asserted:
  - **38.5.1** detailed factual statement of the claim, with all dates, locations and items of Work pertinent to the claim.
  - **38.5.2** A statement of whether each requested additional amount of compensation or extension of time is based on provisions of the Contract or on an alleged breach of the Contract. Each supporting or breached Contract provision and a statement of the reasons why each such provision supports the claim must be specifically identified or explained.
  - **38.5.3** Excerpts from manuals or other texts which are standard in the industry, if available, that support the Contractor's claim.
  - **38-5.4** The details of the circumstances that gave rise to the claim.
  - **38.5.5** The date(s) on which any and all events resulting in the claim occurred, and the date(s) on which conditions resulting in the claim first became evident to the Contractor.
  - **38.5.6** Specific identification of any pertinent document, and detailed description of the substance of any material oral communication, relating to the substance of such claim.
  - **38.5.7** If an extension of time is sought, the specific dates and number of Days for which it is sought, and the basis or bases for the extension sought. A critical path method, bar chart, or other type of graphical schedule that supports the extension must be submitted.
  - **38.5.8** When submitting any claim over \$50,000, the Contractor shall certify in writing, under oath and in accordance with the formalities required by the contract, as to the following:
    - **38.5.8.1** That supporting data is accurate and complete to the Contractor's best knowledge and belief;

- **38.5.8.2** That the amount of the dispute and the dispute itself accurately reflects what the Contractor in good faith believes to be the Department's liability;
- **38.5.8.3** The certification shall be executed by:
  - **38.5.8.3.1** If the Contractor is an individual, the certification shall be executed by that individual.
  - **38.5.8.3.2** If the Contractor is not an individual, the certification shall be executed by a senior company official in charge at the Contractor's plant or location involved or an officer or general partner of the Con-tractor having overall responsibility for the conduct of the Contractor's affairs.
- Auditing of Claims: All claims filed against the Department shall be subject to audit by the Department or its agents at any time following the filing of such claim. The Contractor and its Subcontractors and suppliers shall cooperate fully with the Department's auditors. Failure of the Contractor, its Subcontractors, or its suppliers to maintain and retain sufficient records to allow the Department or its agents to fully evaluate the claim shall constitute a waiver of any portion of such claim that cannot be verified by specific, adequate, contemporaneous records, and shall bar recovery on any claim or any portion of a claim for which such verification is not produced. Without limiting the foregoing requirements, and as a minimum, the Contractor shall make available to the Department and its agents the following documents in connection with any claim that the Contractor submits:
  - **38.6.1** Daily time sheets and foreman's daily reports.
  - **38.6.2** Union agreements, if any.
  - **38.6.3** Insurance, welfare, and benefits records.
  - 38.6.4 Payroll register.
  - **38.6.5** Earnings records.
  - 38.6.6 Payroll tax returns.
  - **38.6.7** Records of property tax payments.
  - **38.6.8** Material invoices, purchase orders, and all material and supply acquisition contracts.
  - **38.6.9** Materials cost distribution worksheets.
  - **38.6.10** Equipment records (list of company equipment, rates, etc.).
  - **38.6.11** Vendor rental agreements.
  - **38.6.12** Subcontractor invoices to the Contractor, and the Contractor's certificates of payments to Subcontractors.
  - 38.6.13 Subcontractor payment certificates.
  - 38.6.14 Canceled checks (payroll and vendors).
  - **38.6.15** Job cost reports.
  - 38.6.16 Job payroll ledger.
  - **38.6.17** General ledger, general journal (if used), and all subsidiary ledgers and journals, together with all supporting documentation pertinent to entries made in these ledgers and journals.
  - 38.6.18 Cash disbursements journals.

- **38.6.19** Financial statements for all years reflecting the operations on the Project.
- **38.6.20** Income tax returns for all years reflecting the operations on the Project.
- **38.6.21** Depreciation records on all company equipment, whether such records are maintained by the company involved, its accountant, or others.
- **38.6.22** If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents.
- **38.6.23** All documents which reflect the Contractor's actual profit and overhead during the years that the Project was being performed, and for each of the five years prior to the commencement of the Project.
- **38.6.24** All documents related to the preparation of the Contractor's bid, including the final calculations on which the total proposed Contract bid price as stated in the Bid Proposal Form was based.
- **38.6.25** All documents which relate to the claim or to any sub-claim, together with all documents that support the amount of damages as to each claim or sub-claim.
- **38.6.26** Worksheets used to prepare the claim, which indicate the cost components of each item of the claim, including but not limited to the pertinent costs of labor, benefits and insurance, materials, equipment, and Subcontractors' damages, as well as all documents which establish the relevant time periods, individuals involved, and the Project hours and the rates for the individuals.
- **38.6.27** The name, function, and pertinent activity of each Contractor's or Subcontractor's official, or employee, in volved in or knowledgeable about events that give rise to, or facts that relate to, the claim.
- **38.6.28** The amount(s) of additional compensation sought and a break-down of the amount(s) into the categories specified as payable under Paragraph 38.4 above.
- **38.6.29** The name, function, and pertinent activity of each Department official, employee, or agent involved in or knowledgeable about events that give rise to, or facts that relate to, the claim.

## ARTICLE 39 DIESEL VEHICLE EMISSIONS CONTROL

- **39.1** The Contractor shall be responsible for compliance with the following provisions:
  - 39.1.1 All Contractor and Subcontractor diesel powered non-road construction equipment with engine horsepower (HP) ratings of 60 HP and above, that are on the Project or are assigned to the Contract for a period in excess of 30 consecutive Days, shall be retrofitted with emission control devices in order to reduce diesel emissions. In addition, all motor vehicles and/or construction equipment (both on-highway and non-road) shall comply with all pertinent State and Federal regulations relative to exhaust emission controls and safety.

- **39.1.2** Retrofit emission control devices shall consist of oxidation catalysts, or similar retrofit equipment control technology that is:
  - **39.1.2.1** Included on the U.S. Environmental Protection Agency (EPA) "Verified Technology List," as may be amended from time to time <a href="http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm">http://www.epa.gov/otaq/retrofit/retroverifiedlist.htm</a> and
  - **39.1.2.** Verified by EPA to provide a minimum emissions reduction of 20% particulate matter ( $PM_{10}$ ), 40% carbon monoxide (CO), and 50% hydrocarbons (HC).
- **39.1.3** Construction shall not proceed until all diesel powered non-road construction equipment meeting the criteria in provision 39.1.1 have been retrofitted, unless the Commissioner grants a waiver under provision 39.2.
- **39.1.4** The Contractor shall at least monthly, assess which diesel powered non-road construction equipment are subject to these provisions. The Contractor shall notify the CT DCS Project Manager of any violations of these provisions.
- **39.1.5** Idling of delivery and/or dump trucks, or other diesel powered equipment shall be limited to three (3) minutes during non-active use in accordance with the Regulations of Connecticut State Agencies Section 22a-74-18(b)(3)(C), which states, in part:

"[N]o person shall cause or allow a Mobile Source to operate for more than three (3) consecutive minutes when such Mobile Source is not in motion, except as follows:

- When a Mobile Source is forced to remain motionless because of traffic conditions or mechanical difficulties over which the operator has no control,
- When it is necessary to operate defrosting, heating or cooling equipment to ensure the safety or health of the driver or passengers,
- When it is necessary to operate auxiliary equipment that is located in or on the Mobile Source to accomplish the intended use of the Mobile Source, (To bring the Mobile Source to the manufacturer's recommended)
- When a Mobile Source is in queue to be inspected by U.S. military personnel prior to gaining access to a U.S. military installation."
- **39.1.6** All Work shall be conducted to ensure that no harmful effects are caused to adjacent Sensitive Receptor Sites. Diesel powered engines shall be located away from fresh air intakes, air conditioners, and windows.
- **39.1.7** If any diesel powered non-road construction equipment is found to be in non-compliance with these provisions by the CT DCS Project Manager, the Contractor will be issued a Non-Conformance Notice and given a 24 hour period in which to bring the equipment into compliance or remove it from the Project. The Contractor's failure to comply with these provisions shall be reason to withhold payment as described in Article 33.
- **39.1.8** Any costs associated with these provisions shall be included in the general cost of the contract. In addition, there shall be no time granted to the Contractor for compliance with these provisions. The Contractor's compliance with these provisions and any associated regulations shall not be grounds for a Change Order.

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**39.2** The Commissioner reserves the right to waive all or portions of these provisions at his/her discretion. The Contractor may request a waiver to all or portions of these provisions with written justification to the Commissioner as to why the Contractor cannot comply with these provisions. A waiver, to be effective, must be granted in writing by the Commissioner.

**END** 

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#### **Appendix 1**



# 7048

	epartment of truction Serv			General C Retainage Reduction	Contractor n Request (SAMPLE)
То:			CT DCS Chief Engineer I Avenue, Hartford, CT 06106		Page 25 of 25
From:		(Insert GC's Name ), (			
Subjec	ct:	Project No. ( ) Re	eduction of Retainage at (	)% project completion	
retaina	ige to an a	amount of <u>insert writte</u>	en percent Percent (insert nu	ents, (insert GC's name) hereby request umerical percent%). The following list contract and has been verified by the General	f items required
	DAS Co	ntractor Performance E	valuation Score is a minimum o	of Sixty (60%) Percent.	
	Contract	requirements and the		chedule and Schedule of Values, in com ner's and/or A/E's comments on the su	
	Timely and proper submission of all Contract Document required submissions: including but not limited to Shop Drawings, material certificates and material samples and the prompt resolution of the Owner's and/or Architect's or Engineer's comments on the submitted material resulting in an appropriate progress of the Work.				
	Proper a	Proper and adequate supervision and home office support of the Project.			
	The Work completed to date has been installed or finished in a manner acceptable to the Owner.				
	The progress of the Work is consistent with the approved CPM Schedule.				
	All appro	oved credit Change Ord	ers have been invoiced.		
	All Chan	ge Order requests for p	ricing are current.		
	The Gen	neral Contractor has and	d is maintaining a clean worksit	e in accordance with the Contract Docume	nts.
	All Subc	ontractor payments are	current at the time of reduction	request.	
	General	Contractor is compliant	with set-aside provisions of the	e contract.	
Genera	al Contrac	tor Certification:			
Projec	t Manager	Recommendation:	(Written Name)	(Signature)	(Date)
			(Written Name)	(Signature)	(Date)
Approv	Allen V.	Herring, P.E. Chief Engineer			
				(Signature)	(Date)

CT DCS - 7048 (Rev. 12.02.11)

7000 - Construction Phase Forms



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# Supplementary Conditions of the Contract for Construction For Design - Bid - Build Department of Administrative Services ● Construction Services State of Connecticut

#### 1.0 Supplementary Conditions:

- 1.1 These Supplementary Conditions modify the State of Connecticut, Department of Construction Services, Section 00 72 13 General Conditions of the Contract for Construction for Design Bid- Build (Rev. 03.26.12), and other provisions of the Contract Documents as indicated below. All provisions which are not so modified remain in full force and effect.
- 1.2 The terms used in these Supplementary Conditions which are defined in the Section 00 72 13 General Conditions of the Contract for Construction for Design Bid- Build (Rev. 03.26.12), have the meanings assigned to them in the General Conditions.
- 2.0 Section 00 72 13 General Conditions Of The Contract For Construction For Design Bid Build:
  - 2.1 ADD: Subsection 3.6 to ARTICLE 3, CORRELATION OF CONTRACT DOCUMENTS, as follows:
    - In accordance with Public Act No. 13-247 (Effective June 19, 2013), wherever the term "Commissioner of Construction Services" is used in the "Bidding Documents" or "Project Manual" the term "Commissioner of Administrative Services" shall be substituted in lieu thereof; and wherever the term "Department of Construction Services" is used in "Bidding Documents" or "Project Manual", the term "Department of Administrative Services" shall be substituted in lieu thereof.
  - 2.2 DELETE: Subsection 28.2 in its entirety from ARTICLE 28, PARTIAL PAYMENTS.

ADD: Subsection 28.2 to ARTICLE 28, PARTIAL PAYMENTS, as follows:

- 28.2 In making such Application For Payment for the Work, there shall not be more than <u>seven</u> and <u>one-half percent (7.5%)</u> deducted from the amount of each Application for Payment to be retained by the Owner as Retainage until Final Completion.
  - 28.2.1 At fifty percent (50%) completion of the Work the Retainage shall be reduced to five percent (5%). All subsequent Applications for Payment shall be subject to five percent (5%) Retainage. Upon Substantial Completion, and in the Commissioner's sole discretion and based upon the factors set forth in Section 28.3, the Retainage may be reduced upon the request of the Contractor and recommendation of the CT DAS Project Manager. In the event of a reduction in Retainage to below five percent (5%), the minimum Retainage withheld shall not be less than the CT DAS Project Manager's estimate of the remaining Work or two and one-half percent (2.5%), whichever is greater. All requests for Retainage Reduction shall be done on CT DAS Form 7048 General Contractor Retainage Reduction Request, which can be found at the end of the General Conditions.
  - **28.2.2** Subsequent to Substantial Completion, in limited circumstances, at the sole discretion of the Commissioner and based upon factors set forth in **subsection 28.3**, a reduction of Retainage below two **and one-half percent (2.5%)** may be considered.
  - **28.2.3** A "Good" Contractor's Performance Evaluation score shall be defined as a minimum total score of sixty percent (60%).
- 2.3 ADD Subsections Definitions to ARTICLE 1 DEFINITIONS, as follows:
  - 2.3.1 DELETE: 1.71 in its entirety from ARTICLE 1 DEFINITIONS.

ADD: Subsection 1.71 to ARTICLE 1 PARTIAL DEFINITIONS, as follows:

**1.71 WORK:** The construction and services required by the Contract Documents, and including all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project and "Work Phase".

ADD: Subsection 1.72 to ARTICLE 1 DEFINITIONS, as follows:

**1.72 WORK PHASE:** Construction of the Project by sequence or time intervals, which may include but not be limited to separate Construction Start Dates, Substantial Completion Dates, Application for Payments, Change Orders, Liquidated Damages, Retainage, and Subcontractors for each Work Phase.



Page 2 of 2

2.4 DELETE: Appendix 1 from Section 00 72 13.1 in its entirety.ADD: New Appendix 1 to Section 00 72 13.1 as follows:

			70.40
CONNECTION	SUT.		7048 General Contractor (GC)
			Retainage Reduction Request
THE STATE OF THE S	a de la companya de l		(Sample)
- O.Milki			Page 2 of 1
То:	Department of Administrative Ser Office of Legal Affairs, Policy and	vices (DAS) Construction Service	s
	450 Columbus Blvd, Suite 1302 –		
	Hartford, CT 06103		
From:	GC's Name		General Contractor (GC)
Subject	: DAS Project Number:	DAS Project Number	
	Reduction of Retainage at:	Written Percent	Percent ( ##.# %)
Date:	Click or tap to enter a date.		
In accord	dance with the General Conditions, Article	e 28 Progress Payments.	
	s Name		
	equests a reduction of retainage to an am	nount of Written Percent	Percent ( ##.# %)
•		<u>-</u>	
	owing list of items required under the Gell Contractor (GC).	neral Conditions is in compliance wi	th the terms of the contract and has been verified by the
	DAS Construction Services Contractor P	orformance Evaluation Spare is a m	inimum of Sixty (609/) Boroomt
뭐			, <del></del>
Timely submission of an appropriate and complete CPM Schedule and Schedule of Values, in compliance with the Contract requirements and the prompt resolution of the Owner's and/or A/E's comments on the submitted material resulting in an appropriate			
	basis for progress of the Work		
	certificates, material samples and the prompt resolution of the Owner's and/or A/E's comments on the submitted material resulting in an appropriate progress of the Work.		
ᅥ	Proper and adequate supervision and ho	ome office support of the Project.	
一一		**	otable to the Owner.
一一	The Work completed to date has been installed or finished in a manner acceptable to the Owner.  The progress of the Work is consistent with the approved CPM Schedule.		
	All approved credit Change Orders have been invoiced.		
	The GC has and is maintaining a clean w	vorksite in accordance with the Cont	ract Documents.
	All Subcontractor payments are current a	at the time of reduction request.	
	GC is compliant with set-aside provisions	s of the contract.	
Canaral	Contractor Contidention.		
General	Contractor Certification:	(Written Name)	(Signature) (Date)
Project	Manager Recommendation:		
	a.iago: Nocommonaanom	(Written Name)	(Signature) (Date)
DAS Ch	ief Engineer or Authorized Representa	tive:	
		(Written Name)	(Signature) (Date)
		END	
CT DAS	- <b>7048</b> (Rev. 05.22.17)		7000 – Construction Phase Forms

**END OF SECTION** 

PAGE 1 OF 1

#### **Set-Aside Contractor Schedule [SAMPLE ONLY]**

#### **VIA EMAIL**

Contractor Name Contractor Address City, State, Zip Code

#### **BID OPENING DATE**

Re: DAS Project Description

DAS Project Number

Date:

#### **Dear Contractor:**

Section 00 45 17 Named Subcontractor Bidders Qualification Statement(s) is / (are) required for this project, only for your Named Subcontractors listed in Table 2.7 of your Section 00 41 00 Bid Proposal Form.

No person whose subcontract exceeds five hundred thousand dollars in value may perform work as a subcontractor on a project, which project is estimated to cost more than five hundred thousand dollars and is paid for, in whole or in part, with state funds, *unless*, at the time of bid submission, the person is prequalified in accordance with the Connecticut General Statutes Section 4a-100, as amended. This includes the contractor's or substantial subcontractor's prequalification classifications, aggregate work capacity ratings and single project limits.

In accordance with **Subsection 2.9** "**Set-Aside Requirements**" of **Section 00 21 13 Instructions to Bidders**, you are required to *list* below the names of each *currently certified* **set-aside contractor** to be used for this project, along with the dollar *amount* to be paid each set-aside contractor.

The responsibility for listing a qualified and certified set-aside contractor rests solely with the bidder and not the State. Listing a set-aside contractor who does not qualify may be considered the same as not listing one at all and the bid may be considered non-responsive and subject to rejection.

Name	Address	* Amount	Indicate Whether: Subcontractor, Or Supplier, Or Both	** Class of Work
SAMPLE	SAMPLE	SAMPLE	SAMPLE	SAMPLE

<sup>\*</sup>Amount: The total dollar amount to be paid to the set aside contractors must not be less than the percentage(s) stated in the Bid Proposal Form.

#### **ATTACHMENTS:**

For Each of the Named Subcontractors:

Attach their Section 00 45 17 Named Subcontractor Bidders Qualification Statement(s)

For Each of the Named Set-Aside SBE/MBE Contractors:

Attach their DAS Set-Aside Certificate of Eligibility (SBE and/or MBE)

For Each of the Named Subcontractors With Subcontracts Greater Than \$500,000:

Attach their DAS Prequalification Certificate and Update (Bid) Statement for the Class of Work

Contractor Authorized Signature & Title	Date
This Form Must Be Received No Later Than	At:
State of Connecticut Department of Administrative Services, Construction Services Office of Legal Affairs, Policy, and Procurement 450 Columbus Boulevard, Suite 1302 Hartford, CT 06103	

<sup>\*\*</sup>Class of Work: Means the name of the trade work to be provided by the Subcontractor or Supplier.

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# State Of Connecticut Department of Administrative Services Construction Services

March 26, 2015

To: All Department of Administrative Services, Construction Services Contractors

Subject: Set-Aside Contract Laws

#### Dear Sir/Madam:

The administration of Governor Dannel P. Malloy is committed to supporting the subject programs by encouraging all contractors on State projects to improve their efforts in these areas.

State law requires contractors doing business with the State to demonstrate non-discrimination by making "good faith efforts" in both hiring and in sub-contracting practices General Statute Section (C.G.S. §) 4a-60.

What does "good faith efforts" mean? It means that you, as contractors, must act affirmatively. It is not good enough to say you can't find minorities and women. You must seek them out. That is the law, and the Department of Administrative Services (DAS) / Construction Services (CS) is committed to enforcing the law. At the same time, we are ready to assist you in making "good faith efforts."

DAS is required by C.G.S. § 4a-60g (b) and (c) to set aside projects (amounting to **twenty-five percent** (25%) of its annual contract awards) for small business and **twenty-five percent** (25%) of that amount for minority business enterprises. DAS may require any general contractor to set aside a portion of the contract for subcontractors who are small businesses or minority business enterprises in lieu of setting aside a project or in addition to setting aside a project.

Therefore, unless otherwise specified in the **Bid Proposal Form**, DAS will require contractors to subcontract **twenty-five percent (25%)** of the total contract value to small businesses certified by DAS and further will require contractors to subcontract 25% of that 25% to minority and women small contractors certified as minority business enterprises by DAS. These statutory goals represent the minimum values expected to be achieved by this program.

Together, we can meet the challenge of providing equal opportunity for minority and women-owned businesses and workers in our State. We expect superior results in the areas of affirmative action, equal employment opportunity, and set-aside contracts. The DAS standard in these areas is not just minimal effort. Our goal is to uphold the letter and the spirit of the law.

For more information on Non-Discrimination and Affirmative Action Provisions for State Contracts please visit the Commission on Human Rights and Opportunities (CHRO) Website at <a href="https://www.ct.gov/chro.">www.ct.gov/chro.</a>

Sincerely yours,

Melody A. Currey Commissioner

PB:pb

AGE 2 OF 7

#### Non-Discrimination and Affirmative Action Provisions for State Contracts

Section 1 CHRO – Contract Compliance Regulations Notification to Bidders:

- **1.1** The contract to be awarded is subject to contract compliance requirements mandated by:
  - 1.1.1 The Connecticut General Statutes (C.G.S.) § 4a-60 and 4a-60a;
  - 1.1.2 C.G.S. § 46a-71(d) and 46a-81i (d) when the awarding agency is the State; and
  - 1.1.3 The Contract Compliance Regulations codified in the Regulations of Connecticut State Agencies (RSCA) §46a-68j-21 through 43, which establish a procedure for awarding all contracts covered by C.G.S. §4a-60 and 46a-71(d).
- 1.2 According to the **Contract Compliance Regulations §46a-68j-30(9)**, every agency awarding a contract subject to the contract compliance requirements has an obligation to "aggressively solicit the participation of legitimate minority business enterprises as bidders, contractors, subcontractors and suppliers of materials."
  - "Minority business enterprise" is defined in C.G.S §4a-60-as a small contractor or supplier of materials fifty-one (51%) percent or more of the capital stock or assets of which is owned by a person or persons:
  - **1.2.1** who are active in the daily affairs of the enterprise;
  - 1.2.2 who have the power to direct the management and policies of the enterprise; and
  - 1.2.3 who are members of a minority, as such term is defined in subsection (a) of C.G.S. §32-9n."
- 1.3 "Minority" groups are defined in C.G.S. §32-9n as:
  - **1.3.1** Black Americans, including all persons having origins in any of the Black African racial groups not of Hispanic origin;
  - **1.3.2** Hispanic Americans, including all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;
  - 1.3.3 Persons who have origins in the Iberian Peninsula, including Portugal, regardless of race;
  - 1.3.4 Women;
  - **1.3.5** Asian Pacific Americans and Pacific Islanders; or
  - **1.3.6** American Indians and persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification.
  - 1.3.7 "Individuals with a disability" is also a minority business enterprise as provided by C.G.S. § 4a-60g (4).
- **1.4** The above "Minority business enterprise" definitions apply to the contract compliance requirements by virtue of **Contract Compliance** Regulations §46a-68j-21(11).

The awarding agency will consider the following factors when reviewing the bidder's qualifications under the contract compliance requirements:

- **1.4.1** the bidder's success in implementing an affirmative action plan;
- 1.4.2 the bidder's success in developing an apprenticeship program complying with RSCA §46a-68-1 to 46a-68-17, inclusive:
- **1.4.3** the bidder's promise to develop and implement a successful affirmative action plan;
- 1.4.4 the bidder's submission of employment statistics contained in the "Employment Information Form", indicating that the composition of its workforce is at or near parity when compared to the racial and sexual composition of the workforce in the relevant labor market area; and
- 1.4.5 the bidder's promise to set aside a portion of the contract for legitimate minority business enterprises. See Contract Compliance Regulations § 46a-68j-30(10) (E).

**Note:** The Commission on Human Rights and Opportunities **(CHRO)** "Employment Information Form" shall be submitted to the DAS/CS Office of Legal Affairs, Policy, and Procurement on behalf of the awarding agency, the Department of Administrative Services (DAS).

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Section 2 Non-Discrimination and other Contract Compliance Requirements:

Pursuant to C.G.S. § 4a-60 and §4a-60a and the RSCA §46a-68j-21 to 46a-68j-43, a contractor agrees to the following:

- 2.1 Not to discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, sexual orientation, mental retardation, or physical disability including, but not limited to, blindness (unless it is shown that such disability prevents performance of the work involved) in the performance of a contract, in any manner prohibited by the federal and Connecticut anti-discrimination and contract compliance laws;
- 2.2 To undertake affirmative action which will insure that applicants with job-related qualifications are employed and that employees are treated, when employed, without regard to whether they belong to any of the groups identified in Paragraph # 1) above;
- 2.3 To include a statement that the contractor is an "affirmative action-equal opportunity employer", in all solicitations or advertisements for employees placed by or on behalf of the contractor;
- To provide each labor union or representative of workers with which such contractor has a collective bargaining agreement and each vendor with which such contractor has a contract, a notice advising them of the contractor's commitments under C.G.S. § 4a-60 and §4a-60a. The notice is available by contacting CHRO:
- 2.5 To post copies of the notice referred to in item 4) in conspicuous places available to employees and applicants;
- To provide **CHRO** with such information requested by said agency, permit access to pertinent books, records, and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of **C.G.S. §4a-60**, **§4a-60**a and **§46a-56** and, cooperate fully with **CHRO**; and,
- 2.7 To include the language of C.G.S. § 4a-60 (a) and §4a-60a (a) in every subcontract or purchase order executed to fulfill any obligation of the contract with DAS.

Section 3 Affirmative Action Requirements for Certain Public Works Contracts for Construction:

Pursuant to C.G.S. § 46a-68c and §46a-68d and, the RSCA § 46a-68j-21 to 46a-68j-29, the following must file an affirmative action plan with the Commission:

- 3.1 A successful bidder on a <sup>1</sup> "public works contract" with a value of \$500,000 or more. The plan must be filed within thirty (30) days after a bid has been accepted by an awarding agency but before a contract is awarded. A plan may be filed in advance of or, at the same time as a bid is submitted.
- 3.2 A contractor with fifty (50) or more employees who has been awarded a "public works contract" in excess of \$50,000 in any fiscal year. A plan must be filed within thirty (30) days of the date a contract is awarded.

**CHRO** must review a plan within **sixty (60) days** of receipt and must either approve or reject a plan. Should **CHRO** approve an affirmative action plan, **CHRO** will issue a certificate of compliance. This certificate of compliance shall be proof of a successful bidder's or a contractor's eligibility to bid or be awarded contracts for a period of **two (2)** years from the date of the certificate. This certificate does not excuse a successful bidder or contractor from being monitored by the **CHRO** for implementation of its affirmative action plan or, from its reporting requirements under C.G.S. 46a-68e and § 46a-68f. (Refer to Section 6) Also, **CHRO** may revoke the certificate if a successful bidder or contractor does not implement its affirmative action plan.

Should **CHRO** opt to disapprove an affirmative action plan, **CHRO** must notify the successful bidder or contractor in writing within **ten (10) days** of the disapproval. The notice will state the reason for disapproval and may provide necessary proposals to bring the plan into compliance. The successful bidder or contractor must then submit a new or amended plan, within **thirty (30) days** of the date the notice of disapproval is mailed by **CHRO**.

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#### Section 3 (Continued):

In addition, **CHRO** may conditionally approve an affirmative action plan for a successful bidder on a public works contract valued at \$500,000 or more. **CHRO** must notify the successful bidder in writing within **ten (10) days** of the conditional disapproval and state the reason for conditional approval and, may provide necessary proposals to bring the plan into compliance. The successful bidder must then submit a new or amended plan or, provide written assurances that it will amend its plan to conform to affirmative action requirements, within **thirty (30) days** of the date the notice is mailed by **CHRO**.

**Note:** The awarding agency (DAS) will provide a successful bidder or contractor with a copy of **CHRO**'s Affirmative Action Plan format. All sections of this Affirmative Action Plan format must be completed by the successful bidder or contractor and forwarded to **CHRO**. Also, the awarding agency (DAS) shall withhold **2%** of the total contract price per month from any payment made to a contractor until such time as the contractor has developed an affirmative action plan, which has been approved by **CHRO**.

1 "public works contract" means any agreement between any individual, firm or corporation and the state or any political subdivision of the state other than a municipality for construction, rehabilitation, conversion, extension, demolition or repair of a public building, highway or other changes or improvements in real property, or which is financed in whole or in part by the state, including, but not limited to, matching expenditures, grants, loans, insurance or guarantees.-C.G.S. § 46a-68b.

#### Section 4 "Good Faith Efforts" to Include Minority Business Enterprises as Subcontractors":

In addition to, or in the absence of, any other subcontractor requirements included in this project, contractors are required to make <sup>2</sup> "**good faith efforts**" to include minority business enterprises in the work of this project as subcontractors (for services and/or material suppliers). For the purpose of identifying minority business enterprises, a minority business enterprise shall be a subcontractor which has a valid certification as such from DAS and/or a subcontractor for which an affidavit has been submitted by the contractor attesting that the subcontractor named as a minority business enterprise meets the minority business enterprise criteria set out in. **C.G.S. § 4a-60(b)**.

<sup>2</sup> "Good faith efforts" means "that degree of diligence which a reasonable person would exercise in the performance of legal duties and obligations" and includes, but is not limited to, the following factors: the contractor's employment and subcontracting policies and practices; affirmative advertising, recruitment, training, technical assistance activities and such other reasonable activities or efforts as CHRO may recommend to ensure the participation of minority business enterprises in state projects.

#### Section 5 Set-Aside Program:

This contract may be subject to the provisions the **Set-Aside Program for Small Contractors** found at **C.G.S. § 4a-60g** and may be awarded only to a contractor certified as a small and/or minority business enterprise by DAS. The notification as to this special provision will be found in the **Bid Proposal Form** for this contract. The listing of eligible "Set-Aside" contractors is found on the <u>DAS Website for SBE or MBE Certification</u>. In the event that the **Set-Aside Program for Small Contractors** applies to this contract, the following special provisions will also apply:

#### 5.1 Amount of Work Required to Be Done by "Set-Aside" Contractors

A contractor awarded a contract on a project pursuant to the provisions of **C.G.S.** § **4a-60g**, as amended, shall be required to perform not less than **thirty (30)** per cent of the work with his/her own forces and shall ensure that not less than **fifty (50)** per cent of the work be performed by contractors or subcontractors who are certified as small contractors or minority business enterprises pursuant to **C.G.S.** § **4a-60g**.

The primary product/service performed by contractors working on a contract awarded under **C.G.S. § 4a-60g** must be the same as the primary product/service described for the contractors on their "Certificate of Eligibility" which is provided to them by DAS.

#### 5.2 Alternate Bonding Available to "Set Aside" Contractors

In lieu of a performance, bid, labor and materials or other required bond, a contractor or subcontractor awarded a contract under C.G.S. § 4a-60g may provide to the awarding authority (DAS) and the awarding authority shall accept a "Letter of Credit". Any such "Letter of Credit" shall be in an amount equal to ten per cent (10%) of the contract for any contract that is less than one hundred thousand (\$100,000) dollars, and in the amount of twenty-five per cent (25%) for any contract that is one hundred thousand (\$100,000) dollars or more.

#### 5.3 Procedures to Follow Regarding Substitution of Named Project "Set-Aside" Subcontractors.

The awarding authority (DAS) may also require the contractor to set aside a portion of the contract for subcontractors who are eligible for set aside contracts. The awarding authority shall not permit substitution of a subcontractor for one named in accordance with the provisions of **C.G.S. § 4b-95** or substitution of a subcontractor for any designated sub-trade work bid to be performed by the contractor's own forces, except for good cause.

Pursuant to **C.G.S. § 4b-95**, the term **"good cause"** includes but is not limited to a subcontractor's or, where appropriate, a general contractor's:

- **5.3.1** Death or physical disability, if the listed subcontractor is an individual;
- **5.3.2** Dissolution, if a corporation or partnership;
- **5.3.3** Bankruptcy;
- **5.3.4** Inability to furnish any performance and payment bond shown on the bid form;
- 5.3.5 Inability to obtain, or loss of, a license necessary for the performance of the particular category of work;
- **5.3.6** Failure or inability to comply with a requirement of law applicable to contractors and subcontractors, or to subcontracts for construction, alteration, or repair projects;
- 5.3.7 Failure to perform his/her agreement to execute a subcontract under C.G.S. § 4b-96.

Any general contractor who violates any provision of C.G.S. § 4b-95 shall be disqualified from bidding on other contracts that are subject to the provisions of Chapter 60 - Construction and Alterations of State Buildings of the C.G.S, for a period not to exceed twenty-four (24) months, commencing from the date on which the violation is discovered, for each violation.

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Section 6	Contract Monitoring and Reporting:
	Contract Monitoring and Reporting.

- **CHRO** has the authority to monitor state contractors pursuant to **C.G.S.** § **46a-68e** and **46a-68f** and **RSCA-§46a-68j-23(3)**. In addition, under the **RSCA** §46a-68j-25(e) and 46a-68j-26 (g), **CHRO** has the authority to monitor the implementation of an affirmative action plan regarding:
  - **6.1.1** a successful bidder who has been awarded a public works contract valued at **\$500,000** or more and:
  - a contractor with **fifty (50)** or more employees who has been awarded a public works contract **in** excess of \$50,000 in any fiscal year.
- In order to monitor the implementation of these plans **CHRO** requires that the following contract monitoring reports be compiled and submitted:
  - **6.2.1 Monthly Employment Utilization Report** (**Form CHRO: 257**): A contractor, on behalf of itself and all subcontractors who perform work on the project during a given month, is required to report on the work hour participation of minority male and female workers in each trade category on the project. The report must be submitted to the contract awarding agency (**DAS**) and to the Commission by the 15<sup>th</sup> day following the end of each calendar month during the term of the onsite construction work of the project.

Website page: <a href="http://www.ct.gov/chro">http://www.ct.gov/chro</a>, then click on Forms, then click on Contract Compliance Forms and Reports.

**6.2.2** Quarterly Small Contractor and Minority Business Enterprise Payment Status Report (Form CHRO: 258). A contractor is required to report on the participation of small contractors or minority business enterprises identified to participate on the project. The report must be submitted to the contract awarding agency (DAS) and to the Commission by the 15<sup>th</sup> day following the end of each calendar quarter during the term of the on-site construction work of the project.

Website page: <a href="http://www.ct.gov/chro">http://www.ct.gov/chro</a>, then click on Forms, then click on Contract Compliance Forms and Reports.

- 6.2.3 In addition, the Commission expects that a contractor will designate an Equal Opportunity/Contract Compliance Officer for its public works project who will compile the above monthly and quarterly reports, as well as, undertake the following responsibilities for implementation of its project Affirmative Action Plan (AAP):
  - .1 Maintain a project Equal Employment Opportunity (EEO) file to include all records, correspondence and other documentation relate to the project AAP.
  - .2 Communicate to and inform all project subcontractors, regardless of tier, and labor referral organizations (if applicable) about project equal employment and AAP commitments and performance requirements.
  - **.3** Participate in project job meetings to inform project subcontractors about project equal employment and AAP performance requirements.
  - .4 Track the use of employment recruitment sources identified in the project AAP regarding all employment opportunities with all subcontractors on the project. Also, maintain documentation of all contacts with these recruitment sources and their responses.

The Commission will forward a copy of the monthly and quarterly report to each contractor on a public works project.

#### **NOTES:**

Bidders and state contractors may review the full text of the before referenced Connecticut General Statutes by accessing either the State Law Library's web site (<a href="http://www.cslib.org/psaindex.htm">http://www.cslib.org/psaindex.htm</a>) or the State Legislatures' web site (<a href="http://www.cga.ct.gov">http://www.cga.ct.gov</a>).

The full text of the RSCA 46a-68j-21 through 46a-68j-43 may be reviewed by accessing the Commission's web site:

(http://www.ct.gov/chro/cwp/view.asp?a=2525&Q=315900&chroPNavCtr=|#45679)

In the alternative, bidders or state contractors may request a copy of these state statutes and regulations by contacting the Commission at (860) 541-3400 (in Hartford) or 1 (800) 477-5737.

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**Section 7** CHRO Contract Compliance Forms:

The following CHRO Contract Compliance Forms are available on the CHRO Website:

- 7.1 Monthly Employment Utilization Report (Form CHRO-257 and CHRO-257a):
  - http://www.ct.gov/chro/lib/chro/257s.pdf
- 7.2 Cumulative Utilization Report (Form CHRO–257b:
  - http://www.ct.gov/chro/lib/chro/257b.pdf
- 7.3 Monthly Small Contractor & MBE Payment Status Report (Form CHRO-258a) <u>and</u> Quarterly Small Contractor & MBE Payment Status Report (Form CHRO-258):
  - http://www.ct.gov/chro/lib/chro/258s.pdf

End of Section 00 73 38 CHRO / Contract Compliance Regulations

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Minimum Rates and Classifications for Building Construction

# **Connecticut Department of Labor Wage and Workplace Standards Division**

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following pages are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or sub-contractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his hourly wage.

Project N	lumber:	BI-CTC-467	Project Town:	Norwalk, CT		
Project: Master Plan Phase III Renovations and Additions						
	Norwalk Community College					
	118 Richards Avenue					
	Norwalk, CT					

The following pages contain:

Contractors Wage Certification Form	1 page
Notice to all Mason Contractors reference Section 31-53 of C.GS. (Prevailing Wages)	1 page
Prevailing Wage Rates - English	15 pages
Informational Bulletin - Occupational Classifications	6 pages
Informational Bulletin – The 10-Hour OSHA Construction Safety and Health Course	2 pages
Footnotes	2 pages
Special Notice re: Wage Rate Adjustments	1 pages
Weekly Payroll Certification Form (WWS-CP1)	1 page
Fringe Benefits Explanation (P)	1 page
Weekly Payroll Certification Form (WWS-CP2)	1 page

As of: August 8, 2018





# THIS IS A PUBLIC WORKS PROJECT

**Covered by the** 

# PREVAILING WAGE LAW

CT General Statutes Section 31-53

If you have QUESTIONS regarding your wages CALL (860) 263-6790

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

# CONNECTICUT DEPARTMENT OF LABOR WAGE AND WORKPLACE STANDARDS DIVISION

### **CONTRACTORS WAGE CERTIFICATION FORM**

**Construction Manager at Risk/General Contractor/Prime Contractor** 

I,	of
Officer, Owner, Authorized Rep.	Company Name
do hereby certify that the	
	Company Name
	Street
	City
and all of its subcontractors will pay all work	kers on the
Project Name and	nd Number
Street and Cit	y
the wages as listed in the schedule of prevail attached hereto).	ling rates required for such project (a copy of which is
	Signed
Subscribed and sworn to before me this	day of
Poturn to:	Notary Public
Return to:  Connecticut Department of I  Wage & Workplace Standar  200 Folly Brook Blvd.  Wethersfield, CT 06109	
Rate Schedule Issued (Date):	

### **Notice**

## To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

#### **Forklift Operator:**

- Laborers (Group 4) Mason Tenders operates forklift solely to assist a mason to a maximum height of nine feet only.
- Power Equipment Operator (Group 9) operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on public works projects. Enforcement. Regulations. Exceptions. (a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (g) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

- (b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.
- (c) Not later than January 1, 2009, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project.
- (d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine

Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

## **Minimum Rates and Classifications for Building Construction**

**ID#**: B 25135

## Connecticut Department of Labor Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: BI-CTC-467 Project Town: Norwalk

State#: FAP#:

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community

College

CLASSIFICATION	<b>Hourly Rate</b>	Benefits
la) Asbestos Worker/Insulator (Includes application of insulating materials, protective coverings, coatings, & finishes to all types of mechanical systems; application of firestopping material for wall openings & penetrations in walls, floors, ceilings	38.25	27.96
Ib) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters.**See Laborers Group 7**		
1c) Asbestos Worker/Heat and Frost Insulator	40.21	29.30

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community College			
2) Boilermaker	38.34	26.01	
3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons	33.48	33.09 + a	
3b) Tile Setter	34.90	25.87	
3c) Terrazzo Mechanics and Marble Setters	31.69	22.35	
3d) Tile, Marble & Terrazzo Finishers	26.70	21.75	
3e) Plasterer	33.48	32.06	

Project: Master Plan Phase III Renovations And Additions At The No	orwark Col	innumity Conege
LABORERS		
4) Group 1: Laborers (common or general), acetylene burners, carpenter tenders, concrete specialists, wrecking laborers, fire watchers.	30.05	20.10
4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofer/mixer/nozzleman (Person running mixer and spraying fireproof only).	30.30	20.10
4b) Group 3: Jackhammer operators/pavement breaker, mason tender (brick), mason tender (cement/concrete), forklift operators and forklift operators (masonry).	30.55	20.10
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is \$26.80.	30.55	20.10
4d) Group 5: Air track operator, sand blaster and hydraulic drills.	30.55	20.10

Project: Master Plan Phase III Renovations And Additions At The No	orwalk Con	nmunity College
4e) Group 6: Blasters, nuclear and toxic waste removal.	31.80	20.10
4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped).	31.05	20.10
4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew.	28.38	20.10
4h) Group 9: Top men on open air caisson, cylindrical work and boring crew.	27.86	20.10
4i) Group 10: Traffic Control Signalman	16.00	20.10
5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	32.60	25.34

Project: Master Plan Phase III Renovations And Additions At Th	e Norwalk Con	nmunity College
5a) Millwrights	33.14	25.74
6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	38.82	26.25+3% of gross wage
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	51.71	32.645+a+b
LINE CONSTRUCTION		
Groundman	26.50	6.5% + 9.00
Linemen/Cable Splicer	48.19	6.5% + 22.00

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community College			
8) Glazier (Trade License required: FG-1,2)	37.18	21.05 + a	
9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	35.47	35.14 + a	
OPERATORS			
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer 2 drums or over, front end loader (7 cubic yards or over), work boat 26 ft. and over and Tunnel Boring Machines. (Trade License Required)	39.55	24.05 + a	
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver (\$3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	39.23	24.05 + a	
Group 3: Excavator; Backhoe/Excavator under 2 cubic yards; Cranes (under 100 ton rated capacity), Grader/Blade; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar); Grader Operator; Bulldozer Fine Grade. (slopes, shaping, laser or GPS, etc.). (Trade License Required)	38.49	24.05 + a	

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community College			
38.10	24.05 + a		
37.51	24.05 + a		
37.51	24.05 + a		
37.20	24.05 + a		
36.86	24.05 + a		
36.46	24.05 + a		
	37.51 37.51 37.20		

Project: Master Plan Phase III Renovations And Additions At The N	orwalk Con	nmunity College
Group 9: Front end loader (under 3 cubic yards), skid steer loader regardless of attachments, (Bobcat or Similar): forklift, power chipper; landscape equipment (including Hydroseeder).	36.03	24.05 + a
Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	33.99	24.05 + a
Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	33.99	24.05 + a
Group 12: Wellpoint operator.	33.93	24.05 + a
Group 13: Compressor battery operator.	33.35	24.05 + a
Group 14: Elevator operator; tow motor operator (solid tire no rough terrain).	32.21	24.05 + a

31.15 24.0	05 + a 05 + a
35.46 24.0	
33.04 24.0	05 + a
33.62 21.0	 05
- }	3.62 21.0

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community College								
10b) Taping Only/Drywall Finishing	34.37	21.05						
10c) Paperhanger and Red Label	34.12	21.05						
10e) Blast and Spray	36.62	21.05						
11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	42.62	31.21						
12) Well Digger, Pile Testing Machine	37.26	24.05 + a						
Roofer: Cole Tar Pitch	41.50	17.00 + a						

Roofer: Slate, Tile, Composition, Shingles, Singly Ply and Damp/Waterproofing	40.00	17.00 + a
15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	43.70	42.40
16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9)	42.62	31.21
TRUCK DRIVERS		
17a) 2 Axle	29.13	23.33 + a
17b) 3 Axle, 2 Axle Ready Mix	29.23	23.33 + a

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community College

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community College								
17c) 3 Axle Ready Mix	29.28	23.33 + a						
17d) 4 Axle, Heavy Duty Trailer up to 40 tons	29.33	23.33 + a						
17e) 4 Axle Ready Mix	29.38	23.33 + a						
17f) Heavy Duty Trailer (40 Tons and Over)	29.58	23.33 + a						
17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	29.38	23.33 + a						
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	43.92	15.84 + a						

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community College								
19) Theatrical Stage Journeyman	25.76	7.34						

Welders: Rate for craft to which welding is incidental.

\*Note: Hazardous waste removal work receives additional \$1.25 per hour for truck drivers.

\*\*Note: Hazardous waste premium \$3.00 per hour over classified rate

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra \$4.00 premium in addition to the hourly wage rate and benefit contributions:

- 1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)
- 2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson
- 3) Cranes (under 100 ton rated capacity)

Crane with 150 ft. boom (including jib) - \$1.50 extra

Crane with 200 ft. boom (including jib) - \$2.50 extra

Crane with 250 ft. boom (including jib) - \$5.00 extra

Crane with 300 ft. boom (including jib) - \$7.00 extra

Crane with 400 ft. boom (including jib) - \$10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Project: Master Plan Phase III Renovations And Additions At The Norwalk Community College

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

# Information Bulletin Occupational Classifications

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53(d).

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification. If unsure, the employer should seek guidelines for CTDOL.

Below are additional clarifications of specific job duties performed for certain classifications:

#### • ASBESTOS WORKERS

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

#### ASBESTOS INSULATOR

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

#### • BOILERMAKERS

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

 BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

#### • <u>CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR</u> LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

#### LABORER, CLEANING

• The clean up of any construction debris and the general (heavy/light) cleaning, including sweeping, wash down, mopping, wiping of the construction facility and its furniture, washing, polishing, and dusting.

#### • DELIVERY PERSONNEL

- If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages <u>are not required</u>. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.
- An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer or tradesman, and not a delivery personnel.

#### • **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. \*License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.

#### • ELEVATOR CONSTRUCTORS

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. \*License required by Connecticut General Statutes: R-1,2,5,6.

#### • FORK LIFT OPERATOR

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

#### GLAZIERS

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers, which require equal composite workforce.

#### • <u>IRONWORKERS</u>

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which require equal composite workforce.

#### INSULATOR

• Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings.

#### LABORERS

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), decorative security fence (non-metal).

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

#### PAINTERS

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hhg for any and all types of building and residential work.

#### • LEAD PAINT REMOVAL

- Painter's Rate
  - 1. Removal of lead paint from bridges.
  - 2. Removal of lead paint as preparation of any surface to be repainted.
  - 3. Where removal is on a Demolition project prior to reconstruction.
- Laborer's Rate
  - 1. Removal of lead paint from any surface NOT to be repainted.
  - 2. Where removal is on a TOTAL Demolition project only.

#### • PLUMBERS AND PIPEFITTERS

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. \*License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.

#### • POWER EQUIPMENT OPERATORS

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. \*License required, crane operators only, per Connecticut General Statutes.

#### ROOFERS

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (demolition or removal of any type of roofing and or clean-up of any and all areas where a roof is to be relaid.)

#### • SHEETMETAL WORKERS

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, facia, louvers, partitions, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers. To include testing and air -balancing ancillary to installation and construction.

#### • SPRINKLER FITTERS

Installation, alteration, maintenance and repair of fire protection sprinkler systems. \*License required per Connecticut General Statutes: F-1,2,3,4.

#### • TILE MARBLE AND TERRAZZO FINISHERS

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

#### • TRUCK DRIVERS

~How to pay truck drivers delivering asphalt is under <u>REVISION</u>~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are so located in proximity to the actual construction location that it is reasonable to include them. \*License required, drivers only, per Connecticut General Statutes.

#### For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

Any questions regarding the proper classification should be directed to:
Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109
(860) 263-6543.

## **Informational Bulletin**

## THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007*, where the total cost of all work to be performed is at least \$100,000)

- (1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);
- (2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;
- (3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least \$100,000;
- (4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;
- (5) The internet website for the federal OSHA Training Institute is <a href="http://www.osha.gov/fso/ote/training/edcenters/fact\_sheet.html">http://www.osha.gov/fso/ote/training/edcenters/fact\_sheet.html</a>;
- (6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;
- (7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;
- (8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;
- (9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

- (10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;
- (11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;
- (12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;
- (13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;
- (14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and
- (15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.
- Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of <a href="http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm">http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm</a>; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTMATELY ARISE CONCERNIG THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

### Connecticut Department of Labor Wage and Workplace Standards Division FOOTNOTES

Please Note: If the "Benefits" listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the "Benefits" section for the occupation lists only a dollar amount, disregard the information below.

## Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons (Building Construction) and

(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

#### **Elevator Constructors: Mechanics**

- a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.
- b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

#### **Glaziers**

a. Paid Holidays: Labor Day and Christmas Day.

#### **Power Equipment Operators**

(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Good Friday, Memorial day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

#### **Ironworkers**

a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

#### **Laborers (Tunnel Construction)**

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

#### **Roofers**

a. Paid Holidays: July 4<sup>th</sup>, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

#### **Sprinkler Fitters**

a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

#### **Truck Drivers**

(Heavy and Highway Construction & Building Construction)

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas day, and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

#### - SPECIAL NOTICE -

To: All State and Political Subdivisions, Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee, effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the *contractor's* responsibility to obtain the annual adjusted prevailing
  wage rate increases directly from the Department of Labor's Web Site. The
  annual adjustments will be posted on the Department of Labor Web page:
  www.ctdol.state.ct.us. For those without internet access, please contact the
  division listed below.
- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each employee, to be attached to the first certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53 Certified Payrolls with a statement of compliance shall be submitted monthly to the contracting agency.						PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS  WEEKLY PAYROLL									Connecticut Department of Labor Wage and Workplace Standards Division 200 Folly Brook Blvd. Wethersfield, CT 06109						
CONTRACTOR NAME AND ADDRESS:							SUBCONTRAC	ΓOR NAME &	ADDRESS		WORKER'S POLICY #			SURANCE CARRIER	2						
PAYROLL NUMBER Week-Ending Date PROJECT NAME & ADDRESS											EFFECTIVE EXPIRATION										
PERSON/WORKER,	APPR	MALE/	WORK			DA	Y AND DA	ATE			Total ST	BASE HOURLY	TYPE OF	GROSS PAY	TO	TOTAL DEDUCTIONS			GROSS PAY FOR		
		FEMALE AND RACE*	CLASSIFICATION  Trade License Type & Number - OSHA 10 Certification Number	S N		T HOURS W	W	TH	F	S	Hours  Total O/T Hours	RATE TOTAL FRINGE BENEFIT PLAN CASH	FRINGE BENEFITS Per Hour 1 through 6 (see back)	FOR ALL WORK PERFORMED	FICA	FEDERAL WITH- HOLDING	STATE WITH-	LIST OTHER	THIS PREVAILING RATE JOB	CHECK # AND NET PAY	
												\$ Base Rate  \$ Cash Fringe  \$ Base Rate  \$ Cash Fringe  \$ Cash Fringe  \$ Cash Fringe	1. \$ 2. \$ 3. \$ 4. \$ 5. \$ 6. \$ 1. \$ 2. \$ 3. \$ 4. \$ 5. \$ 6. \$ 1. \$ 2. \$ 3. \$ 4. \$ 5. \$ 6. \$ 1. \$ 2. \$ 3. \$ 4. \$ 5. \$ 6. \$ 1. \$ 2. \$ 3. \$ 4. \$ 5. \$ 6. \$ 7. \$ 7. \$ 7. \$ 7. \$ 7. \$ 7. \$ 7. \$ 7								
12/9/2013		*IF REQU	IIDED									\$ Base Rate \$ Cash Fringe	1. \$ 2. \$ 3. \$ 4. \$ 5. \$ 6. \$								
WWS-CP1		п къд										*SEE REVERSE	SIDE					P	AGE NUMBER	OF	

# \*FRINGE BENEFITS EXPLANATION (P):

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:	
1) Medical or hospital care	
2) Pension or retirement	5) Vacation, holiday
3) Life Insurance	6) Other (please specify)
CERTIFIED STA	ATEMENT OF COMPLIANCE
For the week ending date of	
I,of	, (hereafter known as
Employer) in my capacity as	(title) do hereby certify and state:
Section A:	
1 1 1	re been paid the full weekly wages earned by them during neral Statutes, section 31-53, as amended. Further, I
a) The records submitted are true and	d accurate;
contributions paid or payable on behadefined in Connecticut General Status of wages and the amount of payment person to any employee welfare fund	echanic, laborer or workman and the amount of payment or alf of each such person to any employee welfare fund, as tes, section 31-53 (h), are not less than the prevailing rate or contributions paid or payable on behalf of each such , as determined by the Labor Commissioner pursuant to ites, section 31-53 (d), and said wages and benefits are not quired by contract;
, , ,	all of the provisions in Connecticut General Statutes, pplicable for state highway construction);
, .	worker's compensation insurance policy for the duration of rage has been provided to the contracting agency;
gift, gratuity, thing of value, or compound indirectly, to any prime contractor, premployee for the purpose of improper	ekbacks, which means any money, fee, commission, credit, ensation of any kind which is provided directly or rime contractor employee, subcontractor, or subcontractor rely obtaining or rewarding favorable treatment in n connection with a prime contractor in connection with a tractor; and
	a certified payroll which he knows to be false is a class D te fined up to five thousand dollars, imprisoned for up to
- ·	ppy of the construction safety course, program or fied payroll required to be submitted to the contracting sons name first appears.
(Signature)	(Title) Submitted on (Date)

Weekly Payroll Certification For Public Works Projects (Continued)

# PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

Week-Ending Date:

Contractor or Subcontractor Business Name:

# WEEKLY PAYROLL

PERSON/WORKER, APPR MALE/ WORK DAY AND DATE Total ST BASE HOURLY TYPE OF GROSS PAY TOTAL DEDUCTIONS GROSS PAY	AY FOR
ADDRESS and SECTION RATE FEMALE CLASSIFICATION S M T W TH F S Hours RATE FRINGE FOR ALL WORK FEDERAL STATE THIS PRE	VAILING CHECK # AND
% AND BENEFITS PERFORMED RATE	E JOB NET PAY
RACE* Trade License Type TOTAL FRINGE Per Hour THIS WEEK	
& Number - OSHA Total BENEFIT PLAN 1 through 6 FICA WITH- WITH- OTHER	
10 Certification Number HOURS WORKED EACH DAY O/T Hours CASH (see back) HOLDING HOLDING	
2. \$	
Base Rate 3. \$	
4. \$	
5. \$	
Cash Fringe 6. \$	
1.\$	
Base Rate 3. \$	
4. \$	
5. \$	
Cash Fringe 6. \$	
1. \$	
Base Rate 3. \$	
4. \$	
Cash Fringe 6. \$	
Cash Fringe   0. 5   1. \$	
Base Rate 3. \$	
5. \$	
Cash Fringe 6. \$	
\$ <u>2. \$</u>	
Base Rate 3. \$	
4. \$	
5. \$	
Cash Fringe 6. \$	

\*IF REQUIRED

12/9/2013 WWS-CP2

NOTICE: THIS PAGE MUST BE ACCOMPANIED BY A COVER PAGE (FORM # WWS-CP1)

PAGE NUMBER \_\_\_\_OF

PAGE 1 OF 7

# Additional Forms to Be Submitted After Bond Commission Funding Approval

**DAS** ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

Table of Contents	No. of Pages
Performance Bond	2
Labor And Material Bond	
Surety Sheet	
Bidder's Certification: Financial Position and Corporate Structure	1

PAGE 2 OF 7

PERFORMANCE BOND Know All Men by These Presents								
THAT				_				of the
Town of				, County				and
State of				, as Princip	al (hereina	fter called the Prin	cipal),	
and				, ,				
(Insert place of Business)  (a surety company authorized to transact business in the State Of Connecticut) as Surety(ies) (hereinafter called the Surety) are held and firmly bound unto the State of Connecticut (hereinafter called the Obligee) in the full penal sum of								
(\$ Dollars, lawful money of the United States, to be paid to said State of Connecticut, to the which payment well and truly to be made and done, the said Principal binds himself, his heirs, executors,								
	•	•	<del>-</del>			Gurety (ies) binds it		
assigns joint	tly and severall	y firmly by the	ese presents.	- '				
Signed, s	sealed and deli	vered this			day of		20	<b>]</b> .
	Т	HE CONE	DITION OF	THIS OBL	IGATION	N IS SUCH TH	HAT	
WHERE	AS said Princ	ipal will enter	into a certain v	written contrac	t with said (	Obligee, to be date	ed-the	
	day of		20	, which writ	ten , as am	ended, contract sh	nall provide for th	ne following:
Project <sup>-</sup>	Title:							
Project I	Location:							
Contrac	t Number:							
Project I	Number:			]				

which contract, including any hereafter made extension, modification or alteration thereof, together with all plans and specifications now made or which may hereafter be made in extension, modification or alteration thereof, is hereby referred to, incorporated in, and made a part of this bond as though herein fully set forth.

**NOW, THEREFORE**, if the said Principal shall well and truly keep, perform and execute all the undertaking, covenants, terms, conditions, and agreements of said contract, as it may be extended, modified or altered, and during the *period* of any guaranty required under the contract, according to its provisions on his or its part to be kept and performed or shall indemnify and reimburse the Obligee for any loss that it may suffer through the failure of the Principal to faithfully observe and perform each and every obligation and duty imposed upon the Principal by the said contract, as it may be extended, modified or altered, at the time and in the manner therein specified, then this obligation shall be null and void, otherwise it shall remain and be in full force and effect.

Any alterations which may be made in the terms of the contract, or in the work done or to be done under it, or the giving by the Obligee of any extension of time for the performance of the contract or any other forbearance on the part of either the Obligee or the Principal, one to the other, shall not in any way release the Principal, and/or the Surety(ies) or either of them, their representatives, heirs, executors, administrators, successors or assigns from liability hereunder, and notice to the Surety(ies) of any such alteration, modification, extension or forbearance is hereby specifically and absolutely waived.

In the event that the Surety(ies) assumes the contract or obtains a bid or bids for completion of the contract, the Surety(ies) shall ensure that the contractor chosen to complete the contract is prequalified pursuant to section 4a-100 of the Connecticut General Statutes, in the requisite classification and has the aggregate work capacity rating and single project limit necessary to complete the contract.

PAGE 3 OF 7

<b>IN TESTIMONY WHEREOF</b> , the said Principal has hereunto set his / its hand and seal, and the said Surety(ies) has/have caused this instrument to be signed by its/their attorney in fact and its corporate seal to be hereunto affixed, the day and year first written.			
Witness as to Principle  (Print Name)  (Print Name)	SEAL  Duly Authorized		
Witness as to Surety  (Print Name)	by		
(Print Name)	no anomey in fact		

**Note:** If more than one surety, add additional lines for additional surety name and address, person signing and title, and two witnesses. Obtain Power of Attorney for each surety.

## End Performance Bond

PAGE 4 OF 7

LABOR AND MATERIAL BOND Know All Men by These Presents			
THAT	of the		
Town of	, County and		
State of	, as Principal (hereinafter called the Principal),		
and			
	(Insert place of Business)		
	in the State Of Connecticut) as Surety(ies) (hereinafter called the Surety)		
are held and firmly bound unto the State of Connec	ecticut (hereinafter called the Obligee) in the full penal sum of		
(\$ Dollars	rs, lawful money of the United States, to be paid to said State of		
Connecticut, to the which payment well and truly to	be made and done, the said Principal binds himself, his heirs, executors,		
administrators and assigns (or itself, its successors	s and assigns), and the said Surety (ies) binds itself, its successors and		
assigns jointly and severally firmly by these presents	ts.		
Circular and delivered this	dough 20		
Signed, sealed and delivered this	day of 20		
THE CONDITION O	OF THIS OBLIGATION IS SUCH THAT		
WHEREAS said Principal will enter into a certain	ain written contract with said Obligee, to be dated the		
day of 20	, which written, as amended, contract shall provide for the following:		
Project Title:			
Project Location:			
Contract Number:			
Project Number:			

which contract, including any hereafter made extension, modification or alteration thereof, together with all plans and specifications now made or which may hereafter be made in extension, modification or alteration thereof, is hereby referred to, incorporated in, and made a part of this bond as though herein fully set forth.

**NOW, THEREFORE**, if the said Principal shall promptly pay for all materials furnished and labor supplied or performed in the prosecution of the work included in and under the aforesaid contract, as it may be extended, modified or altered, and/or required by the General Statutes of Connecticut, as amended, whether or not the material or labor enters into and becomes a component part of the real asset, then this obligation shall be null and void, otherwise it shall remain and be in full force and effect. This bond is provided pursuant to Section 49-41 et seq. of the General Statutes of Connecticut and shall be governed thereby.

Any party, whether a subcontractor or otherwise, who furnishes materials or supplies or performs labor or services in the prosecution of the work under said contract, as it may be extended, modified or altered, and who is not paid therefor, may bring a suit on this bond in the name of the person suing and prosecute the same to final execution and judgment for such sum or sums as may be justly due.

Any alterations which may be made in the terms of the contract, or in the work done or to be done under it, or the giving by the Obligee of any extension of time for the performance of the contract or any other forbearance on the part of either the Obligee or the Principal, one to the other, shall not in any way release the Principal, and/or the Surety(ies) or either of them, their representatives, heirs, executors, administrators, successors or assigns from liability hereunder, and notice to the Surety(ies) of any such alteration, modification, extension or forbearance is hereby specifically and absolutely waived.

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shall ensure that the contractor chosen to complete the	et or obtains a bid or bids for completion of the contract, the Surety(ies) contract is prequalified pursuant to section 4a-100 of the Connecticut ne aggregate work capacity rating and single project limit necessary to
	s hereunto set his / its hand and seal, and the said Surety(ies) has/have fact and its corporate seal to be hereunto affixed, the day and year first
Witness as to Principle	SEAL
(Print Name)	, Its Duly Authorized
(Print Name)	
Witness as to Surety	SEAL
	by
(Print Name)	Its attorney in fact
(Print Name)	

**Note:** If more than one surety, add additional lines for additional surety name and address, person signing and title, and two witnesses. Obtain Power of Attorney for each surety.

End Labor and Material Bond

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# Surety Sheet State Of Connecticut

State Of Connecticut
Department of Administrative Services, Construction Services
Office of Legal Affairs, Policy, and Procurement
450 Columbus Boulevard, Suite 1302
Hartford, CT 06103

1.	Surety Company	
	Name of Surety Co.:	
	Address of Home Office:	
	Telephone Number:	
2.	Agent	
	Name of Surety Co.:	
	Address of Agency:	
	Telephone Number:	
	Attorney-In-Fact:	
	Telephone Number:	
	DAS Project Number:	
	Contractor's Name:	

End Surety Sheet

PAGE 7 OF 7

Bidder's Certification: Financial Position and Corporate Structure		
(Your Name)	(Name Of Company)	
information in the bid is true, that there has been no or corporate structure since its most recent prequal	certifies under penalty of false statement that the substantial change in the bidder's financial position ification certificate was issued or renewed pursuant anges noted in the update statement, and that the erson.	
(Signature)		
(Print Name)		
(Date)		
(DAS Project Number)		

End Bidder's Certification: Financial Position and Corporate Structure

End of Section 00 92 10 Additional Forms To Be Submitted After Bond Commission Funding Approval

PAGE 1 OF 2

# Procedures Regarding Taxation For Nonresident General / Prime Contractor and Subcontractors

# DAS ■ Construction Services ■ Office of Legal Affairs, Policy, and Procurement

According to Connecticut General Statutes § 12-430(7), there are two types of Nonresident Contractors and Subcontractors (*Verified* or *Unverified*) who are required to furnish security for Connecticut taxes arising from jobs performed in Connecticut.

Detailed information can be found by visiting the Connecticut Department of Revenue Services (DRS) website at <a href="https://www.ct.gov/drs">www.ct.gov/drs</a>:

- Under the "For Businesses" title, click on "Withholding Tax"";
- Click on "Registering";
- · Click on "5. What tax types do I need to register for with DRS";
- · Read the information for "Out-of-State" contractors.
- · Click on "SN 2012(2)" for the "Procedure Governing Nonresident Contractors".

Forms can be downloaded from the DRS website (www.ct.gov/drs) as follows:

- · Click on "Forms" at the top of the page;
- Under "Current Year Forms":
  - Click on "Miscellaneous Tax Forms";
  - o Click on "Bond Forms"
- Download the appropriate form.

For questions regarding the nonresident contractor bond law, call DRS at 860-541-7538.

## 1.0 Verified Nonresident Contractors and Subcontractors

Verified Nonresident Contractors are treated just like Resident Contractors. A Verified Nonresident General or Prime Contractor is not required to file a surety bond with DRS. A Verified Nonresident Subcontractor is not required for the General or Prime Contractor to hold back a portion of the amount owed the Subcontractor under the contract.

1.1	Verification Procedure for General/Prime Contractors and Subcontractors:			
	1.1.1 Register with DRS via REG-1 for all appropriate taxes.			
	1.1.2	Submit Form AU-960 "Nonresident Contractor Request for Verified Contractor Status" to DRS. If you have a 3 year filing history with DRS and no delinquencies, then just complete Part I & Part I, otherwise go to Part III.		
	1.1.3 Submit Form AU-961 "Verification Bond" to DRS.			
	1.1.4	If Verified by DRS, submit " <b>Notice of Verified Status</b> " (Verification Letter issued by DRS) to the Connecticut Department of Administrative Services / Construction Services (DAS/CS) Office of Legal Affairs, Policy, and Procurement as specified in Section 00 41 00 Bid Proposal Form.		

# 2.0 Unverified Nonresident Contractors and Subcontractors (for Contracts Greater Than \$250,000):

The requirements for Unverified Nonresident Contractors and Unverified Nonresident Subcontractors (for Contracts greater than \$250,000) are different for General/Prime Contractors and their Subcontractors:

2.1	Unverified Nonresident General or Prime Contractors:			
	2.1.1	Submit Form AU-964 "Surety Bond and Release" to DRS. The Unverified Nonresident General/Prime Contractor is required to file a good and valid surety bond with DRS using Form AU-964 "Surety Bond and Release" for 5% of the contract price to secure payment of required taxes by both the General/Prime Contractor and its Subcontractors.		
	2.1.2	The General/Prime Contractor must provide proof to DAS/CS that they have posted a good and valid surety bond with DRS by providing a copy of <b>Form AU-965</b> " <b>Acceptance of Surety Bond</b> " that verifies acceptance of the bond by DRS*.		

2.2	Unver	Unverified Nonresident Subcontractors:			
	2.2.1	The Resident or Verified or Unverified Nonresident General/Prime Contractor is required to hold back 5% of its payments to the Unverified Nonresident Subcontractor. The General/Prime Contractor must keep the hold-backs in a special fund in trust for the state.			
	2.2.2	The Unverified Nonresident Subcontractor can request that the money be released from the General/Prime Contractor by submitting Form AU-967 "Request for Certificate of Compliance" to DRS. It must be signed by the General/Prime Contractor and the Nonresident Subcontractor and submitted to DRS within 90 days of the completion date.			
	2.2.3	If Form AU-968 "Certificate of Compliance" is issued by DRS, DRS will instruct the General/Prime Contractor holding back the 5% to release the withheld amount to the Nonresident Subcontractor. If the "Certificate of Compliance" is denied or not requested within 90 days of the completion date of the contract, the General/Prime Contractor holding back the 5% will remit the withheld amount on their own Sales & Use tax returns.			
	2.2.4 The 5% holdback does not take the place of any tax returns due from the Ur Nonresident Contractor.				
		The General/Prime Contractor must give the Unverified Nonresident Subcontractor written notice of the hold-back requirements by the time the Subcontractor begins work under the contract.			

<sup>\*</sup>Document(s) must be submitted to the DAS/CS Office of Legal Affairs, Policy, and Procurement as specified in Section 00 41 00 "Bid Proposal Form".

# **End of Section**

00 92 30 Procedures Regarding Taxation For Nonresident General/Prime Contractor & Subcontractors

#### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

**A.** Construction Documents and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Number BI-CTC-467 is entitled Master Plan Phase III Renovations and Additions at Norwalk Community College. It is to be located in Norwalk, Connecticut. It is to be completed and ready for use by the Owner and Agency within the Contract Time specified in Division 00 Section 00 11 16 "Invitation To Bid".

#### **B.** The Project Description:

- 1. Construction and renovation of approximately 25,000 gross square feet.
- 2. All of the Work shall be completed in the Three (3) Phases that shall all start simultaneously upon commencement of the Work as outlined in Section 1.5.
- 3. Allow for Owner occupancy and use of the space as outlined in Section 1.6 and as identified in Section 01 50 00 Temporary Facilities and Controls.
- 4. Hazardous Building Materials (HMA) have been identified at the Site and must be removed/managed prior to disturbance as part of the renovations. Interior and exterior asbestos-containing materials (ACM) had been identified for abatement, lead-based paint has been identified for OSHA worker safety and proper waste disposal considerations and light ballasts and mercury containing equipment reclamation/recycling has been identified for the work scope.
- 5. The building is new and shall be constructed of materials that include but are not limited to the following: The structure shall consist of steel, exterior wall construction shall consist of masonry, glass and metal. Roof construction shall consist of membrane roofing and insulation. Foundations shall consist of concrete. Interior finishes include gypsum, metal and tile floor coverings include poured synthetics, wood rubber, tile, carpet and vinyl. Ceilings shall be gypsum and ACT.
- **6.** The Authority Having Jurisdiction for a Project that <u>does not Exceed</u> the Threshold limitations and is <u>not</u> a Connecticut State University System 2020 Project, as defined by the Connecticut General Statutes, is the CT DAS / DCS Code Unit.
- C. Project Location: The campus of Norwalk Community College located in Norwalk, Connecticut.

#### D. Owner and Agency:

- 1. Owner: The Owner is the State of Connecticut, Department of Administrative Services.
- 2. The authorized representative for the Owner is Lisa Humble, DCS Project Manager. The DCS Project Manager is located at Room 1201, 450 Columbus Boulevard, Hartford, CT, 06106. Phone: (860) 713-5823; Fax: (959) 200-4860; E-mail: Lisa.Humble@ct.gov.
  - a. The DCS Project Manager is the authorized representative for the Department of Administrative Services Commissioner to act in matters involving revoking, altering, enlarging or relaxing any requirement of the contract documents.
- 3. Agency: The Connecticut State (User) Agency is Connecticut State Colleges and Universities
- **4. The Agency Representative** is Keith Epstein. The Agency Representative's title is Vice President for Facilities, Real Estate and Infrastructure Planning. The Agency Representative is located at 61 Woodland Street, Hartford, Connecticut. Phone: (860) 723-0061; E-mail: epsteink@ct.edu.
  - a. The Agency Representative has the administrative authority for the facility and or site where the work is being performed but does not have the authority to change the contract documents or direct the contractor.

#### E. Architect and Engineer:

 The Architectural Firm is Mitchell/Giurgola Architects and is located at 630 Ninth Ave. #711, NY, NY 10036. The Architect representing the firm for this project is John Doherty, AIA.

Phone: (212) 663-4000 Fax: (212) 866-5006 E-mail: doherty@mitchellgiurgola.com

- 2. The Architect and Engineer or their accredited representative is referred to in the Contract Documents as "Architect" or "Architects" or "Engineer" or "Engineers" or by pronouns which imply them. As information for the Contractor, the Architect's or Engineer's status is defined as follows:
  - a. The Architect and Engineer will not make interpretations or decisions directly to the Contractor. All interpretations or decisions will be conveyed through the Construction Administrator to the Project Manager.
  - **b.** As the authorized representative of the Department of Administrative Services Commissioner, the Architect and Engineer is responsible for review of shop drawings, materials, and equipment intended for the work, in accordance with the "General Conditions", and the "Supplementary Conditions."
- 3. Wherever the Architect or Engineer is mentioned in the documents in connection with an administrative function, it shall include the Construction Administrator in that function except for shop drawings.

#### F. Construction Administrator:

1. The Construction Administrator is The Whiting Turner Contracting Company, and is located at 2 Enterprise Drive, Suite 504, Shelton Connecticut, 06484.

Phone: (203) 789-8700 E-mail: Chris.Haley@whiting-turner.com

- **a.** The Construction Administrator is referred to in the Contract Documents as "Construction Administrator" or by pronouns which imply it. All communications concerning the project will be directed through the Construction Administrator or a designated representative(s).
- 2. As information to the Contractor, the Construction Administrator's status is defined as follows:
  - a. The Construction Administrator is the Owner's Agent who will, among other things, monitor the General Contractor's performance, scheduling and construction, process shop drawings, material, and equipment submittals, review and process periodic billings, review and recommend cost changes.
- 3. The Construction Administrator will process all requests for information, interpretations and decisions regarding the meaning and intent of the Contract Documents, consulting with appropriate parties prior to rendering the interpretations or decisions for the Project manager to the Contractor. All such requests and replies shall be in writing.
- G. Work Includes but is not limited to the following:
  - All work shown and specified for BI-CTC-467 Master Plan Phase III Renovations & Additions Norwalk Community College:
  - 2. All Division 02 Existing Conditions
  - 3. All Division 03 Concrete work
  - 4. All Division 04 Masonry work
  - 5. All Division 05 Metals work
  - 6. All Division 06 Wood/Plastic/Composites
  - 7. All Division 07 Thermal and Moisture Protection
  - 8. All Division 08 Openings
  - 9. All Division 09 Finishes
  - 10. All Division 10 Specialties
  - 11. All Division 11 Equipment
  - 12. All Division 12 Furnishings
  - 13. All Division 21 Fire Suppression
  - 14. All Division 22 Plumbing
  - 15. All Division 23 HVAC
  - 16. All Division 26 Electrical
  - 17. All Division 27-Communication
  - 18. All Division 28 Electronic Safety and Security
  - 19. All Division 31 Earthwork

#### 20. All Division 32 Exterior Improvements

#### 21. All Division 33 Utilities

- **H.** The Contractor will include in his bid, all items required in order to carry out the intent of the Work as described, shown and implied in the Contract Documents.
- It shall be the Contractor's responsibility upon discovery to immediately notify the Construction Administrator, in writing, of errors, omissions, discrepancies, and instances of noncompliance with applicable codes and regulations within the documents, and of any work which will not fit or properly function if installed as indicated on the Contract Documents. Any additional costs arising from the Contractor's failure to provide such notification shall be borne by the Contractor.
- **J.** The Work will be constructed under a single lump sum prime general contract.
- K. The Work will be performed in accordance with the Connecticut Department of Energy and Environmental Protection's (DEEP) "General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activities" (DEEP-WPED-GP-015) and Stormwater Pollution Control Plan (SPCP), including, but not limited to, implementing, maintaining, and updating the SPCP, performing regular inspections, conducting and reporting stormwater monitoring activities, retaining records for the required period of time, and performing all post-construction measures and inspections. See Section 01 50 00 "Temporary Facilities and Controls" and Section 31 25 13 "Erosion and Sedimentation Controls" for additional information.

#### 1.4 FUTURE WORK

- **A. Future Contract:** The Owner may award a separate contract for additional work to be performed at the site following Substantial Completion. Completion of that work depends on successful completion of preparatory work under this Contract. The Contract for future work includes the following:
  - 1. Contract: A separate contract will be awarded to Norwalk Community College Campus to provide Procurement of Security System Cameras and wiring to security closets. Procurement of switches and routers within closets.
  - 2. Contract: A separate contract will be awarded to Norwalk Community College Campus to provide only the Active elements of the Telecom System, including wireless points and switches.
  - 3. Contract: A separate contract will be awarded to Norwalk Community College Campus to provide FF&E Loose Theatrical Lighting.
  - Contract: A separate contract will be awarded to Norwalk Community College Campus to provide FF&E - Loose Furniture.

### 1.5 WORK SEQUENCE (PHASES)

- **A. Related Documents:** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Site Phasing Plan is shown on Drawing Sheet No. A0.05
- C. The entire Project shall be constructed in (3) Three Phase(s) with a total duration of 545 Calendar days. All three phases will start simultaneously upon commencement of the work, Phases 2 & 3 will both start and end at the same time as described below. Work of these Phase(s) shall be substantially complete, ready for occupancy within <u>545</u> Calendar Days of commencement of the Work (the "Contract Time"). All Costs associated with the Contractors meeting the requirements of the Simultaneous Phase Scopes of Work and Schedules shall be included in their Base Bid.
- D. Liquidated damages will apply to all phases of this project and will be assessed for each day beyond the date given for substantial completion of the contract as well as each day beyond completion of phases 2 & 3. The value of liquidated damages will be defined within the contract documents.
- E. Phase 1- Student Center and Theater shall include the following portions of work, including all labor and material, shown on the drawings and/or as specified hereinafter. Work of this Phase shall be substantially complete, ready for occupancy within <u>545</u> Calendar Days of commencement of the Work. The intent of Phase 1- Student Center and Theater is to construct the Student Center and Theater and includes the following:
  - All work shown and specified for BI-CTC-467 Master Plan Phase III Renovations & Additions Norwalk Community College:
  - 2. All Division 02 Existing Conditions
  - 3. All Division 03 Concrete work

- 4. All Division 04 Masonry work
- 5. All Division 05 Metals work
- 6. All Division 06 Wood/Plastic/Composites
- 7. All Division 07 Thermal and Moisture Protection
- 8. All Division 08 Openings
- 9. All Division 09 Finishes
- 10. All Division 10 Specialties
- 11. All Division 11 Equipment
- 12. All Division 12 Furnishings
- 13. All Division 21 Fire Suppression
- 14. All Division 22 Plumbing
- 15. All Division 23 HVAC
- 16. All Division 26 Electrical
- 17. All Division 27-Communication
- 18. All Division 28 Electronic Safety and Security
- 19. All Division 31 Earthwork
- 20. All Division 32 Exterior Improvements
- 21. All Division 33 Utilities
- F. Phase 2-Student Center Kitchen and Servery (including all supporting spaces including corridor W149 east of the temporary 2 hour rated construction barrier and ALL supporting MEP's required for all Kitchen and Servery services) shall include all work that is remaining in order to fully complete the entire project, including all labor and material, as shown on the drawings and/or as specified hereinafter. Work of this Phase shall be substantially complete, ready for occupancy within 304 Calendar Days of commencement of the Work. The intent of Phase 2-Student Center Kitchen and Servery is to Provide an early turn over for a fully operational Kitchen, Servery, and supporting areas within 304 Calendar Days of commencement of construction and includes but is not limited to the following:
  - All work shown and specified for BI-CTC-467 Master Plan Phase III Renovations & Additions Norwalk Community College:
  - 2. All Division 02 Existing Conditions
  - 3. All Division 03 Concrete work
  - 4. All Division 04 Masonry work
  - 5. All Division 05 Metals work
  - 6. All Division 06 Wood/Plastic/Composites
  - 7. All Division 07 Thermal and Moisture Protection
  - 8. All Division 08 Openings
  - 9. All Division 09 Finishes
  - 10. All Division 10 Specialties
  - 11. All Division 11 Equipment
  - 12. All Division 12 Furnishings
  - 13. All Division 21 Fire Suppression
  - 14. All Division 22 Plumbing
  - 15. All Division 23 HVAC
  - 16. All Division 26 Electrical
  - 17. All Division 27-Communication
  - 18. All Division 28 Electronic Safety and Security
  - 19. All Division 31 Earthwork

- 20. All Division 32 Exterior Improvements
- 21. All Division 33 Utilities
- G. Phase 3- Student Center Second Floor Women's Room W230 shall include all work that is remaining in order to fully complete the entire project, including all labor and material, as shown on the drawings and/or as specified hereinafter. Work of this Phase shall be substantially complete, ready for occupancy within 304 Calendar Days of commencement of the Work. The intent of Phase 3- Student Center Second Floor Women's Room W230 is to Provide a fully functional and working women's room for early turn over within 304 Calendar Days of commencement of construction and includes but is not limited to the following:
  - All work shown and specified for BI-CTC-467 Master Plan Phase III Renovations & Additions Norwalk Community College:.
  - 2. All Division 02 Existing Conditions
  - 3. All Division 03 Concrete work
  - 4. All Division 04 Masonry work
  - 5. All Division 05 Metals work
  - 6. All Division 06 Wood/Plastic/Composites
  - 7. All Division 07 Thermal and Moisture Protection
  - 8. All Division 08 Openings
  - 9. All Division 09 Finishes
  - 10. All Division 10 Specialties
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  - 14. All Division 22 Plumbing
  - 15. All Division 23 HVAC
  - 16. All Division 26 Electrical
  - 17. All Division 27-Communication
  - 18. All Division 28 Electronic Safety and Security
  - 19. All Division 31 Earthwork
  - 20. All Division 32 Exterior Improvements
  - 21. All Division 33 Utilities

#### 1.6 CONTRACTOR USE OF PREMISES

- **A. General:** During the construction period the Contractor shall have full use of the newly constructed premises for construction operations, including use of the site. The Contractor's use of the premises is limited only by the Owner's right to perform work or to retain other contractors on portions of the Project.
- **B.** Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.
  - 1. Owner Occupancy: Allow for Owner occupancy and use by the public of the existing facility.
  - 2. The Contractor shall confine his operations including storage of materials, supplies, equipment, and apparatus to the areas bounded by the contract limits indicated and as directed in the Contract Documents.
  - 3. Existing roads, drives, walks, and parking areas which are not within the contract limit line are to be kept free and clear at all times. All deliveries for the project are to enter the Norwalk Community College Campus property from as directed by the Construction Administrator. All Contractors are to check all Norwalk Community College Campus roadways for accessibility and clearances for deliveries of all large material and equipment. They shall inform the Construction Administrator at least 72 hours in

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- advance of these deliveries so they can be coordinated with the Agency so appropriate traffic control, etc. can be provided. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- 4. The Contractor shall be responsible for keeping the premises clean and shall pick up rubbish and debris and promptly remove from site.
- 5. Parking for the Contractor's employees will be limited to an area designated by the Construction Administrator, and the Contractor may be required to provide identification stickers for all employees' cars.
- 6. Special precautions shall be taken to protect all wetland areas designated to remain. Prevent any and all sediment, debris, or other materials from getting into these areas. Should any sediment, debris, or other materials get into these areas or if any damage occurs to the vegetation therein, the Contractor shall immediately contact the Construction Administrator for direction.
- 7. The Contractor shall comply with local working hour restrictions, unless specifically approved otherwise in writing by the Owner. Refer to Section 00 72 13 General Conditions Article 37 Hours of Work.
- 8. No signs, other than those approved by the Construction Administrator, will be visible on the premises.
- C. Use of the Existing Building: Maintain the existing building in a weather-tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period. Note: Check with Agency special types of conditions. Contractor personnel are not allowed to use the Cafeteria or vending machines within the existing buildings unless authorized in writing by the agency.

#### 1.7 OCCUPANCY REQUIREMENTS

A. Partial Agency Occupancy: The Owner reserves the right to allow the Agency to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

#### 1.8 OWNER-FURNISHED PRODUCTS

- A. The Owner may furnish various products such as security system cameras and wiring, card access readers and wiring, data/telecom systems and wiring and loose theatrical lighting, and/or as indicated in the construction documents. The Work includes providing support systems to receive Owner's equipment, and mechanical and electrical connections.
  - 1. The Owner will arrange for and deliver necessary shop drawings, product data, and samples to the Contractor.
  - 2. The Owner will arrange and pay for delivery of Owner-furnished items according to the Contractor's Construction Schedule.
  - 3. Following delivery, the Owner will inspect items delivered for damage.
  - 4. If Owner-furnished items are damaged, defective, or missing, the Owner will arrange for replacement.
  - 5. The Owner will arrange for manufacturer's field services and for the delivery of manufacturer's warranties to the appropriate Contractor.
  - **6.** The Contractor shall designate delivery dates of Owner-furnished items in the Contractor's Construction Schedule.
  - 7. The Contractor shall review shop drawings, product data, and samples and return them to the Architect noting discrepancies or problems anticipated in use of the product.
  - 8. The Contractor is responsible for receiving, unloading, and handling Owner-furnished items at the site.
  - 9. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements. The Contractor shall repair or replace items damaged as a result of his operations.

### 1.9 MISCELLANEOUS PROVISIONS

A. Examination of Site:

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- 1. It is not the intent of the Documents to show all existing conditions. All contractors are advised to attend the Pre-bid Conference prior to submitting their Bid Proposals. This is the only official opportunity to visit and examine the site with the Owner, Agency, Architect, Engineer and Construction Administrator.
- 2. Contractors should investigate and satisfy themselves as to the conditions affecting the work, including but not restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, uncertainties of weather, roads or similar physical conditions of the ground, the character of equipment, and facilities needed preliminary to and during the prosecution of the Work. The Contractor should further satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the Contract Documents. Any failure by the Contractor to acquaint himself with the available information shall not relieve him from the responsibility for estimating properly the difficulty and cost of successfully performing the Work.
- 3. If tests have been done for Asbestos containing Material (ACM), and/or Lead Containing Material (LBP), the results are referenced in Section 00 30 00 Available Information and provided in Division 50 00 00 Project-Specific Available Information. See Section 01 35 16 "Alteration Project Procedures" for removal responsibility and additional information. See Fuss & O'Neill Plans HM-01, HM-02, HM-03, & HM-04.
- 4. If tests have been done for Work Involving "Products Containing Persistent Bioaccumulative Toxic Chemicals" (PBT's) such as Polychlorinated Biphenols (PCB's), Di-2-ethylhexyl Phthalate (DEHP) and Mercury, the results are referenced in Section 00 30 00 Available Information and provided in Division 50 00 00 Project-Specific Available Information. See Section 01 35 16 "Alteration Project Procedures" for removal responsibility and additional information. See Fuss & O'Neill Plans HM-01, HM-02, HM-03, & HM-04.

#### 5. Subsurface Geotechnical Investigations:

- Boring logs have been prepared for the site of this work and are on the plans.
- b. If Geotechnical Reports(s) have been prepared for this project they are referenced in Section 00 30 00 Available Information and provided in Division 50 00 00 Project-Specific Available Information.
  - 1) The Contractor must interpret the Geotechnical Report (s) according to his own judgement and acknowledges that he is not relying upon the data as accurately describing the subsurface conditions which may be found to exist.
  - 2) The Contractor further acknowledges that he assumes all risk contingents upon the nature of the subsurface conditions, which shall be actually encountered by him in performing the Work of this Contract.
  - 3) The Contractor should visit the site and become acquainted with all existing conditions and may make their own subsurface investigations to satisfy themselves as to the subsurface conditions. Such investigations shall be conducted only under time schedules and arrangements approved in advance by the Owner.

#### 6. Subsurface Contaminated Soils Investigations:

- a. A Contaminated Soils Report has not been prepared for this Project
- b. If the Contractor should encounter any material suspected or known to contain Contaminated Soils that was not previously identified and assigned as the Contractor's responsibility, the Contractor should immediately notify the Construction Administrator and Owner of same. See Section 01 35 16 "Alteration Project Procedures" for removal responsibility and additional information
- c. No attempt has been made to locate hazardous material associated with existing site utilities, though it is presumed that at least some asbestos may be discovered associated with underground piping during the course of site and site utilities work. If and when such materials appear, the Contractor shall notify the Owner, who shall direct additional work outside of this Contract to assist in cutting up and disposing of same. The Contractor shall assist the hazardous materials contractor(s) with excavating, heavy lifting, and the like at no additional cost to the Owner.

#### B. Pre-Bid Conference:

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1. A Pre-Bid Conference and tour of the site will be conducted as scheduled in Division 00 Section 00 11 16 "Invitation to Bid". This scheduled conference is the only official opportunity for the bidders to tour the site with the Owner, Architect, Engineer, Construction Administrator, and Agency

#### C. Project Documents:

- 1. The Specifications and Drawings are intended to describe and illustrate the materials and labor necessary for the work of this Project.
- 2. Throughout the Technical Specifications, the Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form 816, current edition including any interim and supplemental specifications are referenced. Where so referenced the requirements set forth therein are applicable and made a part hereof. Copies of Form 816 are available from the Connecticut Department of Transportation at a nominal charge.
- D. Site Logistics Plan(s): Site Logistics Plan(s) for this Project are in the Contract Documents, Sheet A0.05. The Site Logistics Plan(s) describe in detail the proposed use of the Site and Building, both inside and outside the Contract Limit Area.
  - 1. Related Section: Section 01 31 00 "Project Management and Coordination". 1.5 Submittals, A. (4).
  - 2. The Site Logistics Plan(s) include, but are not be limited to the following information:
    - a. phasing requirements:
    - b. proposed vehicle and equipment access routes;
    - c. locations of proposed staging/lay-down and storage areas, utility connections;
    - d. delivery access of materials, handicap access;
    - e. building egress, proposed pedestrian traffic flows in the interior and exterior of the building;
    - f. temporary access-ways;
    - g. office trailer and dumpster locations;
    - h. location of perimeter construction fencing and gates;
    - i. other protection measures around and in the building(s);
    - j. temporary partitions, proposed pedestrian traffic flows around and in each building;
    - k. proposed building access points;
    - I. proposed protection measures for trees, shrubs and plantings, interior access-ways;
    - m. coordination of activities that relate to building occupants and other field applied measure to protect and coordinate the work including any relocation of utilities.

#### E. Scope Review:

- Prior to signing a Contract with the State, DCS will conduct a full scope review with the apparent Low Bidder to ensure that all of the requirements have been included within the bid. This scope review will highlight all of the specific requirements of the project, a review of the DCS procedures and all of the Technical sections of the contract documents.
- 2. This process will ensure that all of the scope of work included in the contract documents has indeed been included.

#### F. Drawings, Electronic Data Storage Devices, and Specifications Furnished:

- 1. The Contractor shall receive **one (1)** set of AutoCAD compatible (latest version) Floor Plans on Electronic Data Storage Devices at no cost on or about the time of execution of the Contract from the Architect. Additional sets of AutoCAD compatible (latest version) Floor Plans on Electronic Data Storage Devices from the Architect at the cost of their reproduction, to the contractor.
- The General Contractor will be given (2) sets of the Contract Documents on or about the time of execution of the Contract, free of charge. If additional copies are wanted, they will be available at the direct additional cost of their reproduction, to the contractor.

#### G. Construction Responsibility:

- The Contractor shall be responsible for his construction means, methods, techniques, sequences, and
  procedures employed in the performance of his work and shall have full responsibility for his failure to
  carry out any part of his work in accordance with the contract Documents.
- H. The Contractor shall request approval from the Owner to work overtime. Said request shall be made forty (48) hours in advance. All costs for overtime are included in the Contract Sum as stated in Division 00 Section 00 41 00 "Bid Proposal Form."

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#### I. PMWeb Project Management:

- 1. DCS is using PMWeb as the project management collaborative software tool for this project.
- 2. The General Contractor is required to utilize PMWeb for the duration of this project and shall provide all project information via this program management software. This includes, but is not limited to contracts, applications for payment, change orders, change order proposals, requests for information, etc.
- 3. The DCS Project Manager or the Construction Administrator (CA) shall arrange for training. This training is for the General Contractor's Staff, the DCS project Manager, the Construction Administrator, the A/E, and their representatives.
- 4. DCS will be establishing a project specific email "file" address for this project. The General Contractor shall send an electronic "file" copy of all project documents to this email address, to include but not limited to all project correspondence, project emails, forms, etc.
- 5. The General Contractor is required to scan all documents that contain wet (ink) signatures and send a copy of those documents electronically to the DCS Project Manager and the project specific email "file" address. The hard copy of the wet signature documents shall be transmitted as directed by the DCS Project Manager. This includes, but is not limited to all contracts, change orders, applications for payment, closeout documentation, etc.
- J. Pursuant to C.G.S. Sec. 4a-101, the General Contractor shall compile evaluation information during the performance of the contract on each of its subcontractors who are performing work with a value in excess of five hundred thousand dollars (\$500,000.00). The General Contractor shall complete and submit to DCS evaluations of each such subcontractor upon fifty percent (50%) completion of the project and upon Substantial Completion of the project. The General Contractor acknowledges that its failure to complete and submit these evaluations in a timely manner may, by statute, result in a delay in project funding and, consequently, payment to the General Contractor. The General Contractor agrees to indemnify and hold the State harmless from any loss, damage, or expense that results from or is caused by the General Contractor's failure to complete and submit the evaluations to DCS in accordance with this provision.

PART 2 - PRODUCTS (Not Applicable)

**PART 3 - EXECUTION (Not Applicable)** 

**END OF SECTION 01 11 00** 



#### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

A. Contract Documents and general provisions of the Contract, including General and Supplementary Conditions, other Division 01 Specification Sections, and Section 00 41 00 "Bid Proposal Form" apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Unit Prices.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - Section 01 23 13 Supplemental Bids
  - Section 01 26 00 Contract Modification Procedures
  - Section 01 29 76 Progress Payment Procedures
  - Section 01 35 16 Alteration Project Procedures
  - Section 01 77 00 Closeout Procedures
  - Section 02 21 00 Earthwork
  - Section 02 41 00 Selective Site Demolition
  - Section 02 41 19 Selective Demolition & Alteration Work
  - Section 02 82 13 Asbestos Abatement
  - Section 02 82 14 Asbestos Roofing Abatement
  - Section 02 83 19 Lead Paint Awareness
  - Section 02 84 16 Handling of Lighting Ballasts & Lamps Containing PCB's & Mercury
  - Section 31 11 00 Clearing and Grubbing
  - Section 31 23 33 Trenching and Backfilling
  - Section 31 25 13 Erosion and Sedimentation Controls

#### 1.3 DEFINED UNIT PRICES - GENERAL

- A. This Section includes administrative and procedural requirements for unit prices.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
  - 2. Division 01 Section 01 29 76 "Progress Payment Procedures" for procedures for submitting Application for Payments.
- C. Definition Unit Price: Amount the Contractor acknowledges in the Bid Proposal Form as a price per unit of measurement for materials or services as described in the Contract Documents.

#### D. Procedures:

- 1. Unit Prices included in the Contract Documents are to be used for determining compensation to the Contractor or Owner for changes to the scope of the work indicated in the Contract Documents, and included in the Lump Sum Contract Price. Special Unit Prices are for items complete, in place, and shall be inclusive of furnishing and installing of all material, labor, trucking, overhead, profit, equipment, hoisting, excavation, stockpiling, loading, engineering, scaffolding, power hookups, protection, shop drawings, taxes, permits, appliances, delivery, disposal, insurance, supervision, cost of bond, etc. and shall remain in effect until completion of the Contract.
- 2. Unit Price: Is identified by the Owner as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if the estimated quantities of Work required by the Contract Documents are increased or decreased.

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- 3. Increases or Decreases: Should the amount of the Work required be increased or decreased because of changes in the work ordered in writing by the DAS/CS Project Manager, the Contractor agrees that the following supplemental UNIT PRICES will be decreased 10% for a reduction of work. Each Unit Price shall include all equipment, tools, labor, permits, fees, etc., incidental to the completion of the work involved. All items marked with an asterisk (\*) in the unit price schedules shall include the completion of the excavation, formation and compaction of sub-grade and the disposal of surplus or unsuitable materials in accordance with the Plans and Specifications or as directed by the Construction Administrator.
- The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.
- Defect Assessment: Replace the Work, or portions of the Work, not conforming to the specified requirements. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the work the Architect/Engineer will direct an appropriate remedy or adjust the payment.
- "Unit Price Schedules" are included in this Section. Unit Price Schedules: Sections referenced in the Schedule sections contain requirements for materials described under each unit price.

#### **UNIT PRICE SCHEDULES** 1.4

- A. Unit Price Schedule Earth and Rock Excavation: This Section includes administrative and procedural requirements for the following unit prices and provisions that are to be included in and become part of this Contract to be used in evaluating additions to or deductions from the work called for in the specifications and/or plans.
  - Unless otherwise specified elsewhere in these documents, Contractors are to assume that all excavation is earth; however, if unspecified rock is encountered, it will be paid for at the given unit prices listed in Paragraph "C". Rock prices are net in that allowances for reduced quantities of earth are also included in the unit prices. The prices given include all costs for overhead, profit and rock surveys.
  - 2. Wherever rock to be excavated is encountered, the Contractor shall strip or expose the rock to such an extent that in the Owner's opinion the necessary measurements can be taken. The Contractor shall provide the Owner with a survey by a licensed land surveyor indicating top of rock elevations at points of intersection on a rectilinear grid with lines spaced sufficiently close to show accurately the rock surface contours. At the Owner's option, an additional survey may be furnished by the Owner from a licensed surveyor.
  - If the conditions of the excavation work indicated are clearly of a special nature, the Contractor may ask the Owner for reconsideration of the established unit prices and if granted, the unit prices will not apply, and prices will be negotiated in accordance with Article 13 of the General Conditions.

#### B. Definitions:

- "EARTH" is defined as excavation and shall include removal of all materials other than 'water' and 'rock'.
- "ROCK" is defined as a boulder of one cubic yard or more in volume (1/2 cubic yard for a boulder in trenches), rock in definite ledge formation, and masonry structures of one cubic yard or more in volume, the removal of which requires the use of mechanical equipment or the use of explosives. Rock removed by scarification or ripping method is considered as a separate classification under Paragraph 4.c.1.0.
- "ORIGINAL GRADE" is defined as being the grade which exists at the time of Contract Award.
- "ROUGH GRADE" is defined as being the completed surface of required excavations greater than 13' in width.
- "MASS" excavation is to be considered as an open area whose minimum horizontal dimensions exceed 5.
- "TRENCH" is defined as excavation is defined as the removal of material from areas 13 feet or less in its minimal horizontal dimensions and below the elevation of rough grade or original grade, whichever is lower.

#### C. Procedures:

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- Rock Excavation in Trenches: Basis for Horizontal Measurement:
  - a. Horizontal Measurements: Will be taken between the vertical planes as defined below.
  - b. The Minimum Width of Trenches in Rock: Will be taken as 3' 0".

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- c. Excavation For Walls Or Piers With Footings: The measurements will be taken parallel to and one foot outside of the edges of the concrete footings as called for in the plans (i.e. for 4' 0" footing, rock will be taken as 6' 0" in width).
- d. Excavation For Walls Or Piers Without Footings: The limits of the excavation will be 1' 6" outside of the line of concrete at bottom as shown or called for in the plans (i.e. for a wall with a bottom thickness of 1' 0", the width of the trench will be considered to be 4' 0"). (Caissons are excluded from these measurements).
- Excavation for Pipe Lines: Will be measured at 2' 0" more than the nominal inside diameter of the pipe but in no case less than 3' 0" wide.
- Excavation For Tanks, Vaults, Manholes, Pits, Etc.: Will be measured as 2' 0" greater in both length and width or diameter than the actual exterior dimensions of the structures and this excavation is considered to be trench only if any measured horizontal dimensions is 13' or less.
- g. No allowance will be made for rock removed beyond the above limits.
- **Rock Excavation in Trenches Basis for Vertical Measurement:** 
  - a. To determine depth of trench, vertical measurements will be taken from original grade or rough grade, (whichever is applicable), to the bottom of required excavation. These measurements will define the maximum depths for payments.
  - b. To determine quantity of rock in trench, vertical measurements will be taken from the top of rock as encountered in the trench to 12" below the bottom of required rock excavation. Any over excavation below the required elevation shall be filled with concrete or other material as specified at no cost to the Owner.
  - **c.** No allowance will be made for rock removed beyond the above limits.
- Earth Excavation in Trenches Basis of Measurement: (Horizontal & Vertical): The basis of measurements and allowance limit for earth excavation in trenches is identical to that indicated for rock excavation in trenches, except that there will be no allowance for 12" below the required elevation. In addition the following will prevail:
  - Maximum allowable widths for earth excavation in trenches without shoring:

Trench Depth - Classification		Add To Nominal ID Of Pipe Or To Footing Width		
	0 ft 6 ft.	3 ft.		
Over	6 ft 10 ft.	5 ft.		
Over	10 ft 15 ft.	7 ft.		
Below 15 ft. deep the width of the trench shall be based on the individual case. The final depth of				
trench will determine the actual width for payment.				

- b. If shoring is required the measurement shall be taken between the exterior walls of the shoring not to exceed 4' plus the I.D. of the pipe (for all depths).
- To determine quantity of earth in trench, vertical measurements will be taken from the original or rough grade to actual bottom of earth excavation required.
- Unit Prices Earth and Rock Excavation (Basis for Payment): Prices include backfill with excavated material if it is suitable. Prices also include all excavation and disposal of all surplus or unsuitable material. Where replacement with the excavated material is prohibited or a particular backfill material is specified, the cost of the delivered replacement material in a volume equal to the above excavation pay limits minus the volume of the items installed in the trench shall be paid for at a prior negotiated price. Prices do not include costs of shoring and de-watering but do include sloping for sides of excavation. Payment and credit amounts shall be determined in the following manner: Widths and depths of trench excavation as indicated. The total quantity of earth or rock excavation encountered in each depth payment category shall be paid for at its respective unit price as shown below. For example, in a 15' trench excavated by machine, the first 6' will be paid for at the 0' - 6' price; the next 4' will be paid for at the over 6' - 10' price and the next 5' will be paid for at the over 10' - 15' price. Thus three different price brackets will prevail.

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a.	EAR	TH EXCAVATION - HAND	UNIT	\$ ADD	\$ DEDUCT
1.0	In Trenches (0' - 6' deep)		C.Y.	36.00	28.80
2.0	In Tr	enches (below 6' deep)	Prices Must Be Negotiated Before Work Is Started.		tiated Before
b.	EAR	TH EXCAVATION - MACHINE	UNIT	\$ ADD	\$ DEDUCT
1.0	Oper	n Area (All Depths)	C.Y.	18.81	15.05
2.0	In Tr	enches:			
	2.1	In trenches (0' - 6' deep)	C.Y.	14.27	11.40
	2.2	In trenches (6' - 10' deep)	C.Y.	19.71	15.75
	2.3	In trenches (10' - 15' deep)	C.Y.	35.00	28.00
	2.4	In trenches (15' - 20' deep)	C.Y.	75.00	60.00
C.	ROC	K EXCAVATION	UNIT	\$ ADD	\$ DEDUCT
1.0	Oper	n Areas, Rock Removed By Ripping (Any Amount) – Net Rock	C.Y.	103.50	82.80
2.0	Oper	Areas, With Explosives:			
	2.1	Net Rock (Total Quantity Up To 100)	C.Y.	126.00	100.80
	2.2	Net Rock (Total Quantity Up To 1,000)	C.Y.	60.00	48.00
	2.3	Net Rock (Total Quantity More Than 1,000)	C.Y.	28.00	22.40
3.0	In Trenches, Boulders, Remove By Machine		C.Y.	45.00	36.00
4.0	In Tr	enches, Ripping Of Rock By Machine	C.Y.	105.00	84.00
5.0	In Trenches, With Explosives:				_
	5.1	Net Rock (0' - 4' Deep)	C.Y.	95.60	76.50
	5.2	Net Rock (4' - 10' Deep)	C.Y.	125.00	100.00
	5.3	Net Rock (10' - 15' Deep)	C.Y.	150.00	120.00
	5.4	Net Rock (15' - 20' Deep)	C.Y.	200.00	160.00
	5.5	Net Rock (Over 20' Deep)	Prices Must Be Negotiated Bowles Started.		tiated Before
6.0	Jack	Holes (For Hydraulic Lift/Elevators)	L.F.	95.00	76.00
7.0	Open Or Mass Areas (If Explosives Are Prohibited): Net Rock			125.00	100.00
8.0	Trench Excavation With Rock Splitters and Jack Hammer or Hoe Ram (If Explosives Are Prohibited): Net Rock  150.00  120.00				

## D. Unit Price Schedule – Hazardous Building Materials Abatement:

A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions, other Division 01 Specification Sections, and Technical Specifications apply to this Section. Base Bid Specification Sections and drawings including Section 02 82 13 Asbestos Abatement, Section 02 82 14 Asbestos Roofing Abatement Section and Hazardous Materials Abatement, Section 02 83 19 Lead Paint Awareness, Section 02 84 16 Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury, and/or Drawings HM-01 thru HM-04 apply to this section.

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### B. Unit Price Schedule – Hazardous Building Materials Abatement:

1.	HAZA	RDOUS BUILDING MATERIALS ABATEMENT	BASE BID QUANTITY	UNIT	\$ ADD/ DEDUCT
	1	SMALL CONTAINMENT PREPARATION TO ENCLOSE ASBESTOS ABATEMENT AREAS (>160 SF/260 LF)	Per Section 02 82 13	CONTAINMENT	\$1,500.00
	2	LARGE CONTAINMENT PREPARATION TO ENCLOSE ASBESTOS ABATEMENT AREAS (>160 SF/260 LF)	Per Section 02 82 13	CONTAINMENT	\$3,500.00
	3	CEMENTITIOUS ROOF SHINGLES REMOVAL AND DISPOSAL AS ACM	136	SF	\$10.00
	4	ROOF DRAIN CAULKING REMOVAL AND DISPOSAL AS ACM	4 LF	LF	\$20.00
	5	ROOFING DEBRIS REMOVAL AND DISPOSAL AS ACM	100	SF	\$25.00
	6	MUDDED PIPE FITTING INSULATION REMOVAL AND DISPOSAL AS ACM	100	EA	\$50.00
	7	FLOOR TILE AND ASSOCIATED MASITC REMOVAL AND DISPOSAL AS ACM	6,500	SF	\$7.00
	8	PLASTER REMOVAL AND DISPOSAL AS ACM	320	SF	\$7.00
	9	MIRROR GLUE REMOVAL AND DISPOSAL AS ACM	6	EA	\$10.00
	10	WINDOW CAULKING REMOVAL AND DISPOSAL AS ACM	360	LF	\$16.00
	11	WINDOW UNIT WITH GLAZING COMPOUND COMPLETE REMOVAL AND DISPOSAL AS ACM	180	EA	\$150
	12	EXPANSION JOINT CAULKING REMOVAL AND DISPOSAL AS ACM	100	LF	\$12.00
	13	DOOR CAULKING REMOVAL AND DISPOSAL AS ACM	40	LF	\$15.00
	14	CEMENTITIOUS SOFFIT PANELING REMOVAL AND DISPOSAL AS ACM	200	SF	\$15.00
	15	CAULKING ASSOCIATED WITH FASCIA REMOVAL AND DISPOSAL AS ACM	30	LF	\$15.00
	16	EXTERIOR FOUNDATION CAULKING REMOVAL AND DISPOSAL AS ACM	260	LF	\$15.00
	17	ROOFING MATERIALS (BUILT-UP ROOF LAYERS, FLASHING, TARS) REMOVAL AND DISPOSAL AS ACM	1,000	SF	\$7.00
	19	FIRE DOOR REMOVAL AND DISPOSAL AS ACM	0	EA	\$200.00
	20	DAMPPROOFING REMOVAL AND DISPOSAL AS ACM	0	SF	\$25.00
	21	VAPOR BARRIER UNDER CONCRETE FLOOR REMOVAL AND DISPOSAL AS ACM	3,025	SF	\$35.00
	22	PCB LIGHT BALLAST REMOVAL AND DISPOSAL	0	EA	\$10.00
	23	DEHP LIGHT BALLAST REMOVAL AND RECYCLING	152	EA	\$5.00
	24	LIGHT TUBE/BULB REMOVAL AND RECYCLING	314	EA	\$5.00
	25	REMOVAL AND DISPOSAL OF LEAD PAINT	Per Section 02 83 19	SF	\$3.00
	26	REMOVAL AND DISPOSAL OF LEAD BASED PAINT	Per Section 02 83 19	SF	\$8.00

2. The Add/Deduct Unit Prices shown in the table above are a price per unit measurement for materials, services, or work added to or deducted from the Contract Sum by appropriate modification if the <u>Base Bid Quantities</u> of the Work listed in the above Schedule and described in the corresponding Sections, including Section 02 82 13 Asbestos Abatement, Section 02 82 14 Asbestos Roofing Abatement, Section 02 83 19 Lead Paint Awareness, Section 02 84 16 Handling of Lighting Ballasts & Lamps Containing PCB's & Mercury and/or Hazardous Materials Abatement Drawings HM-01 thru HM-04 are increased or decreased.

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- 3. The <u>Base Bid Quantities</u> for each type of Work listed in the above Schedule and described in the corresponding Section shall be included in the **Lump Sum Bid**.
- 4. Unit Prices shall be negotiated if there is a change in scope of work.

PART 2 - PRODUCTS (Not Applicable)

**PART 3 - EXECUTION (Not Applicable)** 

END OF SECTION 01 20 00

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#### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing Supplemental Bids.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 00 Section 00 41 00 Bid Proposal Form
  - 2. Division 01 Section 01 20 00 Contract Considerations
  - 3. Division 01 Section 01 33 00 Submittal Procedures
  - 4. Division 01 Section 01 60 00 Product Requirements

#### 1.3 DEFINITIONS

- A. Definition: "The monetary value stated in the Bid to be added to the amount of the Base Bid if the corresponding Work, as described in the Bidding Documents, is accepted." A Supplemental Bid is an amount proposed by bidders and stated on the Bid Proposal Form for certain work defined in the Bidding Documents that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - The cost for each supplemental bid is the net addition to the Contract Sum to incorporate the Supplemental Bid into the Work. Supplemental Bids are only accepted in the numerical order that they are listed on the Bid Proposal Form and never accepted out of numerical sequence. No other adjustments are made to the Contract Sum.

#### 1.4 PROCEDURES

- **A.** Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
  - Include as part of each Supplemental Bid, miscellaneous devices, accessory objects, and similar items
    incidental to or required for a complete installation whether or not mentioned as part of the
    Supplemental Bid.
  - 2. Consider all work that must be accomplished for complete incorporation of the Supplemental Bids including modifications to Base Bid items.
  - 3. Include in lump sum prices for Supplemental Bids all costs of labor, materials, equipment, permits, fees, insurance, bonds, overhead, and profit.
  - 4. Immediately after award of Contract, advise all necessary subcontractors, vendors, and suppliers as to which Supplemental Bids have been selected by Owner. Use all means necessary to alert those subcontractors, vendors, and suppliers involved as to all changes in the work caused by Owner's selection or rejection of Supplemental Bids.
  - 5. Coordinate related work and modify surrounding work to integrate work of each Supplemental Bid.
- B. Execute accepted Supplemental Bids under the same conditions as other Work of this Contract.
- **C. Schedule:** A "Schedule of Supplemental Bids" is included at the end of this Section. It contains all of Specification Sections, and applicable portions of Drawings and Details that govern the scope, quality, and execution of work that is referenced in the Schedule and contain all of the requirements necessary to achieve the Work described under each Supplemental Bid.

# PART 2 - PRODUCTS (Not Applicable)

## **PART 3 - EXECUTION**

#### 3.1 SCHEDULE OF SUPPLEMENTAL BIDS

- A. Supplemental Bid No. 1: Requires the provision and installation of Audio Video Systems as described in Specification Section 274100 and AV series of drawings
- B. Supplemental Bid No. 2: Requires the construction of the mechanical equipment screen, supporting structure and roof penetrations at the Student Center roof as described in Specification Section 05 12 00 Structural Steel Framing, 07 41 20 Metal Wall Panels and drawings A2.03S, A3.00S, 10/A4.00S, S2.03S, S5.00S and 9/S7.01S.

END OF SECTION 01 23 13

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#### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for equals and substitutions made after award of the Contract.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for submitting the Contractor's Construction Schedule and the Submittal Schedule.
  - Division 01 Section 01 42 20 "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.
  - 3. Division 01 Section 01 60 00 "Product Requirements" specifies requirements governing the Contractor's selection of products and product options.

#### 1.3 DEFINITIONS

- A. Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.
- **B.** Equals or Substitutions General: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract.

#### 1.4 SUBMITTALS

- A. Equals and Substitution Request Submittals: The Owner will consider requests for equals or substitutions if made prior to the Receipt of the Competitive Bid. The information on all materials shall be consistent with the information herein. After the contract award, substitutions will be considered for materials or systems specified that are no longer available. It will not be considered if the product was not purchased in a reasonable time after award. The Contractor shall submit all equal and substitutions requests on the "Equal or Substitute Product Request (Form 7001)", an example of which is shown at the end of this Section. The Form is available from the Construction Administrator (CA). See Article 15 in the General Conditions for further refinement and information.
- **B.** The Contractor is required to prepare and submit three (3) copies of the required data for the first manufacturer listed or procedure listed in the specifications section with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended including the size, rating performance, LEED® compliance, and cost. All submissions must include all the required data for the first listed manufacturer or procedure as specified, as well as the required data for the proposed Equal or Substitution. This will enable the Owner and Architect to determine that the proposed Equal or Substitution is or is not substantially equal to the first listed manufacturer or procedure.
  - Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
  - 2. Provide complete documentation showing compliance with the requirements for equals or substitutions, and the following information, as appropriate:
    - a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors that will be necessary to accommodate the proposed Equal or Substitution.
    - b. A detailed comparison chart of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
    - **c.** Product Data, including Shop Drawings and descriptions of products and fabrication and installation procedures.
    - **d.** Samples, where applicable or requested.
    - e. A statement indicating the effect on the Contractor's Construction Schedule or CPM Schedule compared to the schedule without approval of the Equal or Substitution. Indicate the effect on overall Contract Time.

- f. Cost information, broken down, including a proposal of the net change, if any in the Contract Sum.
- **g.** The Contractor's certification that the proposed Equal or Substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
- **h.** The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the Equal or Substitution to perform adequately.
- 3. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within seven (7) days of receipt of the original request for equal or substitution request. The Architect will notify the Construction Administrator who will notify the Owner of recommended acceptance or rejection of the proposed equal or substitution, within fourteen (14) days of receipt of the request, or seven (7) days of receipt of additional information or documentation, whichever is later. The Construction Administrator will give final acceptance or rejection by the Owner not less than seven (7) days after notification.
  - a. Any request deemed an "Equal" and accepted by the Construction Administrator, Architect, Owner, and Agency will result in written notification to the Contractor and will <u>not</u> be in the form of a change order for an "Equal".
  - **b.** Any request deemed a "Substitution" and rejected or approved by Construction Administrator, Architect, and Owner may result in written notification to the Contractor and may be in the form of a change order if the "Substitution" is approved.

#### **PART 2 - PRODUCTS**

#### 2.1 EQUAL OR SUBSTITUTIONS

- A. Conditions: The Architect will consider the Contractor's request for Equal or Substitution of a product or method of construction when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests to the Construction Administrator without action except to record noncompliance with these requirements.
  - 1. The proposed request does not require extensive revisions to the Contract Documents.
  - 2. The proposed request is in accordance with the general intent of the Contract Documents.
  - 3. The proposed request is timely, fully documented, and/or properly submitted.
  - 4. The proposed request can be provided within the Contract Time. However, the Architect will not consider the proposed request if it is a result of the Contractor's failure to pursue the Work promptly or coordinate activities properly.
  - 5. The proposed request will offer the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. However, if the proposed request requires the Owner to incur additional responsibilities, including but not limited to, additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or similar considerations, then the Owner will have just cause to reject the request for Equal or Substitution.
  - **6.** The proposed request can receive the necessary approvals, in a timely manner, required by governing authorities having jurisdiction.
  - 7. The proposed request can be provided in a manner that is compatible with the Work as certified by the Contractor.
  - **8.** The proposed request can be coordinated with the Work as certified by the Contractor.
  - The proposed request can uphold the warranties required by the Contract Documents as certified by the Contractor.
- **B.** The Contractor's submission and the Architect's review of Submittals, including but not limited to, Samples, Manufacturer's Data, Shop Drawings, or other such items, which are not clearly identified as a request for an Equal or Substitution, will not be considered or accepted as a valid request for an Equal or Substitution, nor does it constitute an approval.

#### PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 25 00



#### 7001 Equal or Substitute Product Request

Page 1 of 2 Pre-Bid Request Phase: (If Pre-bid only) Current Bid Due Date: Request No.: Dated: To: State of Connecticut DAS Project No.: Department of Administrative Services, Construction Services Project Name / Location: References: Specification(s): Section(s): Paragraph(s): Drawing(s): Drawing(s) No(s): Detail(s) No(s): **Contractually Specified Product:** Contractor Proposed Product: Substitute: Proposed Product is: Equal: Model No.: IMPORTANT: See Attached Data For Both Specified And Proposed Products As Required By Article 15 General Conditions. Data attached: Drawings: Product Data: Reports: Samples: Other: Tests: Reason(s) for not providing the Specified Product: Similar Installation: Project Name: Architect's Name: Project Location: Owner's Name: Date Installed:

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7000 - Construction Phase Forms



# 7001 Equal or Substitute Product Request

Page 2 of 2					
Will proposed substitution impact other parts of the Work?  No					
Actual Dollar Savings to the State of Connecticut if substitution is accepted:					
The Undersigned Certifies: That The Proposed Request For An Equal Or Substitute Product Conforms To All Of The Requirements Of Division 01 General Requirements, Section 01 25 00 Substitution Procedures.					
Request Submitted By General Contractor / CMR:  (Firm's Typed Name)					
By: (Typed Name) (Title) (Signature) (Date)					
Contractor / CMR Send copies to : DAS PM: CA: CA:					
Consultant's Request Received on (Date):  Consultant's Review – This Substitution Request is:  Approved:  (Submittal(s) in accordance with Div. 01 General Requirements, Section 01 33 00 Submittal Procedures.)  Approved as Noted:  (Submittals in accordance with Div. 01 General Requirements, Section 01 33 00 Submittal Procedures.)  Rejected:  Use Specified Materials.  Request Not Received Within Specified Time Period - Use Specified Materials.					
Reviewed Issued By:   Name:					
CONSULTANT Send copies to: DAS PM					
Copies: Project File Red R2					

END

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7000 - Construction Phase Forms

# **PART 1 - GENERAL**

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing contract modifications.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 20 00 "Contract Considerations" for administrative requirements governing use of Unit Prices.
  - 2. Division 01 Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after award of the Contract.
  - 3. Division 01 Section 01 29 76 "Progress Payment Procedures" for administrative procedures governing Applications for Payment.
  - 4. Division 01 Section 01 32 16.13 "CPM Schedules" for requirements for CPM scheduling and reporting progress of work.
  - Division 01 Section 01 33 00 "Submittal Procedures" for requirements for submittal of the Construction Progress Schedule or CPM Schedule.
  - 6. General Conditions "Article 13 Compensation for Changes in the Work".
- C. All Forms referenced in this Section are available for download from the DAS website (<a href="www.ct.gov/DAS">www.ct.gov/DAS</a>)> Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 7000 Series Construction Phase Forms.

# 1.3 REQUESTS FOR INFORMATION

- A. In the event that the Contractor or subcontractor, at any tier, determines that some portion of the drawings, specifications, or other contract documents requires clarification or interpretation by the Architect, the Contractor shall submit a "Request for Information" in writing to the Architect via the Construction Administrator. "Requests for Information" may only be submitted by the Contractor and shall only be submitted on the "Request for Information" forms as required by the Owner.
  - In the "Request for Information", the Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Architect.
  - 2. In the "Request for Information", the Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
  - The Owner acknowledges that this is a complex project. Based upon the owner's past experience with projects of similar complexity, the Owner anticipates that there will probably be some "Requests for Information" on this project.
  - 4. The Architect will review all "Requests for Information" to determine whether they are valid "Requests for Information". If it is determined that the document is not a valid "Request for Information", it will be returned to the Contractor, unreviewed as to content, for resubmittal on the proper form and in the proper manner.
  - 5. A "Request for Information Response" shall be issued within seven (7) days of receipt of the request from the Contractor unless the Owner determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Owner, the Owner will, within seven (7) days of receipt of the request, notify the Contractor of the anticipated response time. If the Contractor submits a "Request for Information" on an activity with seven (7) days or less of float on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Architect to respond to the request provided that the Architect responds within the seven (7) days set forth above.
  - 6. A "Request for Information Response" from Architect will not change any requirement of the Contract Documents. In the event the Contractor believes that the "Request for Information Response" will cause a change to the requirements of the Contract Documents, the Contractor shall within five (5) days give

PROJECT NO.: BI-CTC-467 (Issue: 06/01/18) written notice to the Construction Administrator stating that the Contractor believes the "Request for Information Response" will result in a "Change Order" and the Contractor intends to submit a "Change Order Proposal" request. Failure to give such written notice within five (5) days shall waive the Contractor's right to seek additional time or cost under the requirement these Requirements.

# 1.4 MINOR CHANGES IN THE WORK

A. The Architect, through the Construction Administrator, will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract Time, on the "Supplemental Instructions" form as required by the Owner.

### 1.5 PROPOSAL REQUEST

- A. Architect/Owner-Initiated Requests For Proposals: The Architect or Owner will issue a detailed description of proposed changes in the Work via the Construction Administrator that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. Such requests shall be on a "Proposal Request" form as required by the Owner.
  - 1. "Proposal Request" is issued for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
  - 2. Within (14) days of receipt of a "Proposal Request", submit a "Change Order Proposal" with the required information necessary to execute the change to the Construction Administrator for the Architect's/Owner's review.
    - a. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time
    - d. The Agency is tax exempt. All Contractor and Subcontractor services provided under your Contract with the State of Connecticut may not be exempt from taxes. The Department of Revenue Services can guide you as to which services are exempt and which are not. Please contact the State of Connecticut, Department of Revenue Services at 1-800-382-9463 or 860-541-3280.
    - e. Dollar values shown on the Schedule of Values shall not be the governing (or deciding) final amounts for change orders involving either additional charges or deletions.

# 1.6 CHANGE ORDER PROPOSAL

- A. When either a "Request for Information" from the Contractor or a "Proposal Request" from the Architect or Owner results in conditions that may require modifications to the Contract, the Contractor may propose changes by submitting a request for a "Change Order Proposal" to the Architect via the Construction Administrator on forms as required by the Owner. These forms shall also include "Change Order Proposal Workbook(s)" as required by the Owner.
  - Include statements outlining the reasons for the change and the effect of the change on the Work. Provide
    a complete description of the proposed change. Indicate the effect of the proposed change on the
    Contract Sum and Contract Time.
  - Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities as directed by Article 13 of the General Conditions of the Contract for Construction.
  - 3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
  - 4. Comply with requirements in Division 01 Section 01 25 00 "Substitution Procedures" if the proposed change requires an equal or substitution of one product or system for a product or system specified.
  - 5. The State of Connecticut construction contract has the following tax exemptions:
    - a. Purchasing of materials which will be physically incorporated and become a permanent part of the project.
    - b. Tools, supplies and equipment used in fulfilling the construction contract are not exempt.
    - c. Services that are resold by the Contractor are exempt, i.e. if a Contractor hires a plumber, carpenter or electrician, a resale certificate may be issued to the subcontractor because these services are considered to be integral and inseparable component parts of the building contract

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- C. "Change Order Request" Forms: Use "Change Order Proposal" and "Change Order Proposal Worksheets" forms as required by Owner.
- D. A "Change Order Proposal" cannot be submitted without either prior submission of a "Request for Information" from the Contractor or as a response to a "Proposal Request" submitted by the Architect or Owner.
- E. Any "Change Order Request" submitted without a prior submittal of a "Request for Information" or as a response to a "Proposal Request" will be immediately rejected and returned to the Contractor.

# 1.7 CONSTRUCTION CHANGE DIRECTIVE

# A. "Construction Change Directive":

When the Owner and the Contractor disagree on the terms of a "Change Order Proposal" resulting from either a "Request for Information" or "Proposal Request", then the Architect through the Construction Administrator may issue a "Construction Change Directive" on a "Construction Change Directive" form as authorized by the Owner. The "Construction Change Directive" instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a "Change Order".

- 1. The "Construction Change Directive" contains a complete description of the change in the Work. It also designates the method to be followed to determine change in the Contract Sum or Contract Time.
- 2. Contractor must proceed with the Work once a "Construction Change Directive" is issued.
- The change in the Contract Sum and Contract Time resulting from the issuance of a "Construction Change Directive" will be based on "Time & Material" or "Unit Prices".
- 4. Issuance of "Construction Change Directive" does not guarantee payment for the Work described in the "Construction Change Directive".
- B. Documentation: The Contractor shall maintain detailed records on a time and material basis of work required by the "Construction Change Directive".
  - After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
  - 2. The final value shall be negotiated based on the supporting data to determine the value of the work.

### 1.8 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Contractor's "Change Order Proposal", the Construction Administrator will issue a "Change Order" for signatures of the Architect, Owner and the Contractor on a "Change Order" form as required by the Owner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 26 00

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# **PART 1 - GENERAL**

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- A. This Section specifies procedures for preparation and submittal of the Contractor's Applications for Payment.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
  - 1. Notice to Bidders: Article 10
  - **2.** General Conditions: Articles: 27 "Schedule of Values, Application for Payment"; 28 "Partial Payments"; 31 "Final Payment"; and 32 "Owner's Right to Withhold Payments".
  - Division 01 Section 01 32 16.13 "CPM Schedules" for requirements for CPM scheduling and reporting progress of work.
  - 4. Division 01 Section 01 33 00 "Submittal Procedures".
  - 5. Division 01 Section 01 77 00 "Closeout Procedures" for requirements for Final Payment.

### 1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the "Schedule of Values" with preparation of the CPM Schedule or Construction Schedule. Use "Schedule of Values" form as required by the Owner
  - 1. Submit the "Schedule of Values" to the Construction Administrator at the earliest possible date but no later than **twenty-one (21)** days after Contract Start Date.
  - 2. Sub-schedules: Where Work is separated into phases requiring separately phased payments, provide sub-schedules showing values correlated with each phase of payment.
- B. Format and Content: Use the Project Manual Table of Contents as a guide to establish the format for the "Schedule of Values". Provide at least one line item for each Specification Section on electronic media printout.
  - Identification: Project identification on the Schedule of Values shall include, but not be limited to, the following:
    - a. Owner
    - b. Project Number
    - c. Project Name
    - d. Project Location
    - e. Contractor's name and address.
  - 2. Arrange the "Schedule of Values" in tabular format as required by the Owner, containing separate columns including, but not limited to, the following Items:
    - a. Item Number.
    - b. Description of Work with Related Specification Section or Division Number.
    - c. Scheduled Values broken down by description number, type material, units of each material.
      - Include break down of General Condition requirements, i.e. bonds, insurance premiums, taxes, job mobilization, temporary facilities, field supervision and layout, operation and maintenance manuals, punch list activities, project record documents, demonstration and training, overhead, and profit as separate line items.
    - d. Name of subcontractor.
    - e. Name of manufacturer or fabricator.
    - f. Name of supplier.
    - g. Retainage.

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### h. Contract sum in sufficient detail.

- 3. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
- Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual Table of Contents. Break principal subcontract amounts down into several line items. In addition, the following items listed below must be included.
  - a. Site Logistics Plan (01 31 00): a lump sum at 1/20 of one percent of the base bid total project cost at the time of submission of this plan.
  - Coordination Drawings (01 31 00): a lump sum of this cost for payment at the submittal of this product a minimum cost of 1/10<sup>th</sup> of one percent of the base bid total project cost or \$5,000 whichever is greater.
  - Photographic Documentation (01 32 33): a monthly cost of \$1,000 per month to be paid each month upon receipt of the photographs or forfeit of that month's payment.
  - Submittal Schedule (01 33 00): a lump sum payment calculated at 1/20th of 1% of the base bid total project cost upon receipt of the schedule
  - Waste Collection & Cleaning (01 50 00): a monthly cost. A minimum payment of \$1,000 to \$3,000 (based on size & complexity of the project) with forfeit of that monthly payment if not done.
  - As-Built Updates (01 31 00): a monthly cost, a minimum payment of \$1,000 with forfeit of that monthly payment if not done.
  - Start-up and Adjusting (01 75 00): a lump sum cost upon completion. (to be determined by the DAS/CS Project Manager (PM) with Architect/Engineer and Construction Administrator (CA) advice)
  - Schedule (01 32 16.13): a lump sum payment upon receipt of the base line schedule. A payment of 40% of the total amount of the total cost which is to be calculated at 1/8th of one percent of the base bid total project cost. Monthly updates using the remainder of the cost divided evenly over the accepted schedule duration with a forfeit of the monthly payment of the update is not received on time.
    - Any forfeited amounts being withheld by the CA for non-performance will be adjusted at the final payment by a credit change order to the owner.
- 5. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
- Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
- 7. General Conditions: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
  - Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

#### 1.4 APPLICATIONS FOR PAYMENT

- Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and Construction Administrator and paid for by the Owner.
  - The initial "Application for Payment", the "Application for Payment" at time of "Substantial Completion", and the final "Application for Payment", involve additional requirements.
- B. Payment-Application Terms: The Owner will process monthly progress payments. The Contractor may submit applications for payment on a monthly basis.
- C. Payment-Application Forms: Use the "Application for Payment" form as required by the Owner. Present the required information on electronic media printout or Owner approved form; multiple pages should be used if required.
  - For each item, provide a column including but not limited to the following items:
    - a. Item Number.

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- b. Description of Work and Related Specification Section or Division.
- **c.** Scheduled Value, break down by units of material and units of labor.
- **d.** Work Completed from previous application.
- e. Work Completed this period.
- Materials presently stored.
- g. Total Completed and stored to date of application.
- h. Percentage of Completion.
- i. Balance to Finish.
- j. Retainage.
- D. Application Preparation: Complete every entry on the Application form. At the time of Final Payment only, include an executed Application form by a person authorized to sign legal documents on behalf of the Contractor. The Construction Administrator will return incomplete Applications without action.
  - 1. Entries shall match data on the "Schedule of Values".
  - Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.
- E. Transmittal: Except for final payment, submit to the Construction Administrator by a method ensuring receipt within forty-eight (48) hours. One (1) complete, signed and notarized original of each Application for Payment, including lien waivers and similar attachments when required, along with six (6) copies. For Final Payment, nine (9) complete, signed and notarized copies shall be submitted.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.
- **F.** Applications for Payment: Administrative actions and submittals, that must precede or coincide with submittal of the first Application for Payment and all subsequent Application for Payments including, but not limited to, the following items:
  - 1. List of subcontractors and suppliers' name, FEIN/Social Security numbers, and Connecticut Tax Registration Numbers.
  - 2. List of principal suppliers and fabricators.
  - 3. Schedule of Values.
  - 4. Contractor's Construction Schedule (preliminary if not final).
  - 5. Schedule of principal products.
  - 6. Submittal Schedule (preliminary if not final).
  - 7. List of Contractor's staff assignments.
  - 8. List of Contractor's principal consultants.
  - 9. Copies of all applicable permits.
  - 10. Copies of authorizations and licenses from governing authorities for performance of the Work.
  - 11. Proof that subcontractors have been paid amounts included on the Contractor's Application for Payment within thirty (30) days after the Owner has paid the Contractor for the particular Application for Payment in accordance with Connecticut General Statute § 49-41a (a)(1).
  - 12. Releases of Lien from subcontractors with amounts included on the Contractor's Application for Payment when Contractor has been paid by the Owner for the particular Application for Payment but the subcontractors have not been paid.
  - **13.** Proof that as-built documents are updated as required by Section 01 77 00 "Closeout Procedures.
  - 14. Initial as-built survey and damage report, if required.
  - 15. Update the "Contractor's Master Subcontract Agreement List" and submit copies all recently executed Subcontract Agreements in accordance with CGS § 4b-96.
    - **15.1.** The "Contractor's Master Subcontract Agreement List" shall list all Subcontract Agreements in order of Contract Sum magnitude (from high to low) in the following format:

**Contractor's Master Subcontract Agreement List** 

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Subcontractor Name	Minority Or Small Business Designation	Trade	Address	Contract Sum

16. In accordance with CGS § 42-158j (b):

Each payment requisition submitted shall include a statement showing the status of all pending construction change orders, other pending change directives and approved changes to the original contract or subcontract. Such statement shall identify the pending construction change orders and other pending change directives, and shall include the date such change orders and directives were initiated, the costs associated with their performance and a description of any work completed. As used in this section, "pending construction change order" or "other pending change directive" means an authorized directive for extra work that has been issued to a contractor or a subcontractor and identified by an official Change Order Number or Construction Change Directive Number assigned by the State of Connecticut.

- Application for Payment at Substantial Completion: Following issuance of the Certificate of Substantial Completion submit an Application for Payment form; use the form as required by the Owner. Present the required information on electronic media printout as applicable that include, but are not limited, to the following:
  - 1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
  - Administrative actions and submittals that shall precede or coincide with this application include, but are not limited to, the following:
    - 2.1 Occupancy permits and similar approvals.
    - 2.2 Warranties (guarantees) and maintenance agreements.
    - 2.3 Test/adjust/balance records.
    - 2.4 Maintenance instructions.
    - 2.5 Meter readings.
    - 2.6 Startup performance reports.
    - 2.7 Changeover information related to Owner's occupancy, use, operation, and maintenance.
    - 2.8 Final cleaning.
    - 2.9 Application for reduction of retainage and consent of surety.
    - Advice on shifting insurance coverage. 2.10
    - 2.11 Final progress photographs.
    - 2.12 List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.
- H. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited, to the following:
  - Completion of Project Closeout requirements.
  - Completion of list of items remaining to be completed as indicated on the attachment to the Certificate of Substantial Completion.
  - 3. Ensure that unsettled claims will be settled.
  - Ensure that incomplete Work is not accepted and will be completed in accordance with a schedule prepared by the Contractor which is acceptable to the Owner.
  - Transmittal of required Project construction records to the Owner (including as-built documents specified in Section 01 77 00 "Closeout Procedures").
  - **6.** Certified property survey.
  - 7. Proof that taxes, fees, and similar obligations were paid.
  - Removal of temporary facilities and services.

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- **9.** Removal of surplus materials, rubbish, and similar elements (Reference Section 01 74 19 "Construction Waste Management & Disposal").
- 10. Change of door locks to Owner's access.
- **11.** The requirements of the General Conditions and Supplementary Conditions for Final Acceptance, Final Completion, Final Inspection, and Final Payment.
- **12.** Asbestos, lead or other hazardous material manifests.
- **13.** Completion of "Building Contractor Reporting Form" as supplied by Department of Construction Services, for all Contractors, Subcontractors, Vendors, Suppliers, etc. who work on the Contract. The form includes the following information:
  - a. Contractor/Subcontractor name.
  - b. FEIN/Social Security Numbers
  - c. Connecticut Tax Registration Numbers
  - d. Type of work
  - e. Name of business and address
  - f. Remittance address.

# PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 29 76

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# **PART 1 - GENERAL**

#### 1.1 **RELATED DOCUMENTS**

 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:
  - 1. General project coordination procedures.
  - 2. Conservation.
  - 3. Coordination Drawings, including Site Logistics Plans.
  - 4. Administrative and supervisory personnel.
  - 5. Cleaning and protection.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 29 76 "Progress Payment Procedures" for Schedule of Values items
  - Division 01 Section 01 31 19 "Project Meetings" for progress meetings, coordination meetings, and preinstallation conferences.
  - Division 01 Section 01 32 16.13 "CPM Schedules" for requirements for CPM scheduling and reporting progress of work.
  - 4. Division 01 Section 01 50 00 "Temporary Facilities and Controls".
  - Division 01 Section 01 60 00 "Product Requirements" for coordinating general installation.
  - Division 01 Section 01 71 23 "Field Engineering" specifies procedures for field engineering services, including establishment of benchmarks and control points.
  - Division 01 Section 01 77 00 "Closeout Procedures" for coordinating contract closeout. 7.
  - Division 01 Section 01 91 00 "Commissioning" defines the commissioning process.

#### 1.3 **CONSTRUCTION ADMINISTRATOR**

# A. Construction Administrator:

The Construction Administrator is identified in Division 01 Section 01 11 00 "Summary of Work".

# **Construction Mobilization:**

- Cooperate with the Construction Administrator in the allocation of mobilization areas of the site, for field offices and sheds, for agency facility access, traffic, and parking facilities.
- During Construction, coordinate use of site and facilities through the Construction Administrator.
- Comply with Construction Administrator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- d. Comply with instructions of the Construction Administrator for use of temporary utilities and construction facilities.
- Coordinate field engineering layout as specified in Division 01 Section 01 71 23 "Field Engineering" for work under the instructions of the Construction Administrator.

#### 1.4 COORDINATION

- Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.
  - Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.

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- 2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
- 3. Make provisions to accommodate items scheduled for later installation.
- **B.** Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
  - Prepare similar memoranda for the Construction Administrator, Owner and separate contractors where coordination of their work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - Preparation of schedules.
  - 2. Installation and removal of temporary facilities.
  - 3. Delivery and processing of submittals.
  - 4. Progress meetings.
  - 5. Project closeout activities.
  - 6. As-Builts coordinate monthly meetings to assure up-dates being performed.

### 1.5 SUBMITTALS

- **A.** Coordination Drawings: Prepare coordination drawings to complete detailed coordination of systems and components and to integrate information about fabrication and installation.
  - 1. Thoroughly prepare coordination drawings, as further stipulated in Part 3 "Execution", reviewing all contract documents and consulting with all entities contributing to or involved with each portion of the work under consideration.
    - a. Show the relationship of all components shown on any separate Shop Drawings.
    - **b.** Indicate required desired installation sequences.
    - c. Comply with requirements contained in Division 01 Section 01 33 00 "Submittal Procedures".
  - 2. Prepare coordination drawings for installation of all products and materials fabricated by separate entities.
  - 3. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components, including but not limited to: all site-utility entry points; all ceiling and roof cavities in all areas; all electrical, telecommunications and mechanical rooms; all stage-boundary interface areas; all data rooms; all food service and dining rooms; all theatre rooms and their support spaces; all video studios, broadcast classrooms and their support facilities; and all such other conditions required to coordinate the work. After demolition, field measure existing conditions such as the ceiling structure in the existing kitchen/cafeteria of the West campus and the theater ceiling in the East campus. Ensure that the base drawings developed for the coordination drawings identify the field conditions accurately.
  - 4. Prepare a Site Logistics Plan(s) showing: The entire project area and limits; all routes into and out of site; all staging and stockpiling and lay-down areas; all aspects of phasing/staging; all parking, paving and fencing; and all specific provisions to satisfy requirements of Division 01 Sections, including but not limited to Field Engineering and Temporary Facilities and Controls. The Site Logistics Plan shall coincide with and complement the general staging plans and site plans outlined in the contract bidding documents. It is intended that the Contractor shall present this refined plan for approval by the Construction Administrator. The fencing shown on this plan is required for all phases. Exact placement and timing of installations and removals will be reviewed and approved by the Construction Administrator prior to implementation. An additional allotment of various fencing is specified in Division 32, which the Contractor shall provide, install, and relocate at various intervals, for installation and removal by the Contractor per the direction of the project's Construction Administrator. This staging and logistics plan will require refinement and change for each phase/stage of the project. The Site Logistics Plan(s) shall be drawn at a scale no smaller than 1"=40' and shall be submitted as stipulated in Division 01 Section 01 29 76 "Progress Payment Procedures", but in no case later than (30) days after Notice to Proceed.
  - Prepare coordination drawings showing locations of surface recesses and voids, as well as offsets and breaks, requiring filling and/or feathering, both those initially visible and those discovered during the

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course of work. Review with Owner and Architect to obtain direction for filling and feathering. Revise drawing(s) to record directions for same for field and record purposes.

- B. Staff Names: Prior to the contract start date, submit a list of the Contractor's principal staff assignments, including the superintendent, project safety officer, and other personnel in attendance at the Project Site. Identify individuals and their duties and responsibilities. List their addresses and telephone numbers.
  - Post copies of the list in the Project meeting room, the temporary field office, and at each temporary telephone.
  - Provide resumes of each staff member proposed for the Project. This shall include the Project Manager, Project Superintendent and Safety Officer.

# PART 2 - PRODUCTS (Not Applicable)

### **PART 3 - EXECUTION**

#### 3.1 GENERAL COORDINATION PROVISIONS

- A. Inspection of Conditions: The Contractor shall require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed and coordinate such inspections with the Construction Administrator and authorities having jurisdictions. If unsatisfactory conditions exist notify the Construction Administrator immediately. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. The Contractor shall coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.
- Coordination Drawings: Before construction work can begin, the Contractor shall submit to the Architect coordination drawings in the form of (a) reproducible (vellum) transparencies at not less than 1/4-inch scale and (b) CAD files of the coordination drawings on CDROM. Such drawings will be required throughout all areas for trades as described below. These drawings shall show resolutions of trade conflicts in congested areas. The Architect will supply base drawings (with the title blocks removed), including floor plans, reflected ceiling plans, and structural framing plans, in the form of electronic CAD files on CDROM, using the AutoCAD release edition specified with the files, to the Contractor for distribution to the trades for use in developing the coordination drawings. Each trade contractor shall create separate layers within the CAD files to show the work of their trade. Prepare coordination drawings as follows:
  - The HVAC subcontractor shall initiate 1/4-inch scale drawings done on AutoCAD (latest version) showing ducts and piping in plan and section. Sheet metal shop drawings must be approved prior to starting coordination drawings.
  - The Sprinkler subcontractor shall then add layers to superimpose his piping layout on the coordination drawings.
  - The Electrical subcontractor shall then add layers to superimpose all the electrical information on the coordination drawings. Said information is to include but not necessarily be limited to cable trays, equipment, lighting, conduits, bus duct, etc. Show space allowances reserved for work under other contracts, such as audio-visual wiring and equipment.
  - The Plumbing subcontractor shall then add layers to complete the coordination drawing by drawing his piping (including pitch) on the coordination drawings.
  - Subcontractors for specialties, furnishings, equipment and special construction shall add layers to show their work to assure full coordination of all systems.
  - The Construction Administrator shall review the completed coordination drawings for general compliance and then submit them to the Architect for his review. All subcontractors shall rework the drawings until all systems are properly coordinated.
  - The Ceiling subcontractor shall utilize the drawings to prepare acoustic panel ceiling drawings and any other suspended ceiling drawings, and shall indicate areas of conflict with the work of other trades by drafting the location of grids, panels and tiles.
  - The Contractor shall indicate Architectural/Structural conflicts or obstacles and coordinate to suit the overall construction schedule. The Contractor shall locate all precut and prefabricated holes and openings in structural steel on the CAD coordination drawing files as required for HVAC, plumbing, fire protection and electrical work. The Contractor shall coordinate these holes and openings with the

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- structural steel fabricator during the structural steel shop drawing development phase. Coordination to take place on schedule so as to permit shop fabrication of all structural steel holes and openings. The Owner will not be held responsible for the costs associated with field fabrication of structural openings resulting from the lack of timely and thorough coordination.
- The Contractor shall expedite all drawing work and coordinate to suit the construction schedule. The Contractor shall then review these drawings and compare them with the Architectural, Structural, Equipment, and other drawings and determine that all of the work can be installed without undue interference. Prior to the submittal to the Architect, areas of potential conflict shall be brought to the attention of the Contractor who shall convene a coordination meeting of all parties involved, for the purpose of resolving all utility conflicts. The Contractor shall supervise and direct corrective measures and have all trades sign acceptance of the drawings. Submit four (4) hard copies of each drawing to the Architect and two (2) copies to the Construction Administrator for the record, and only after all conflicts have been accommodated.
- 10. If the coordination meeting fails to resolve coordination conflicts, the Contractor shall indicate the nature of such conflicts in a detailed RFI, proposing the most economical solution.
- 11. The Contractor shall not permit work by trades to proceed in a given bay or area until all trade foremen agree on the exact arrangements for each room or area. If a given trade proceeds prior to trades approval, then if necessary, that trade shall revise their work, if necessary, at no extra cost, in order to permit other trades to proceed.
- 12. Submit all coordination drawings on CD-ROM, in addition to hard copy.
- D. The Construction Administrator will meet with the Contractor on all major items of coordination.

#### 3.2 **CLEANING AND PROTECTION**

- A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering, where required, to assure protection from damage or deterioration.
- B. Clean and provide maintenance on completed construction as construction per manufacturers requirements through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.
- C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:
  - 1. Excessive static or dynamic loading.
  - 2. Excessive internal or external pressures.
  - 3. Excessively high or low temperatures.
  - 4. Thermal shock.
  - 5. Excessively high or low humidity.
  - **6.** Air contamination or pollution.
  - 7. Water or ice.
  - 8. Solvents.
  - 9. Chemicals.
  - 10. Light.
  - 11. Radiation.
  - 12. Puncture.
  - 13. Abrasion.
  - 14. Heavy traffic.
  - **15.** Soiling, staining, and corrosion.
  - 16. Bacteria.
  - 17. Rodent and insect infestation.
  - 18. Combustion.
  - 19. Electrical current.

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- **20.** High-speed operation.
- 21. Improper lubrication.
- 22. Unusual wear or other misuse.
- 23. Contact between incompatible materials.
- 24. Destructive testing.
- 25. Misalignment.
- 26. Excessive weathering.
- **27.** Unprotected storage.
- 28. Improper shipping or handling.
- 29. Theft.
- 30. Vandalism.

END OF SECTION 01 31 00

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# **PART 1 - GENERAL**

# 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

# 1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
  - 1. Start Date meeting (establishes start date)
  - 2. Pre-construction conferences.
  - 3. Pre-installation conferences.
  - 4. Progress meetings.
  - 5. Safety
  - 6. Coordination
  - 7. As-built drawings review
  - 8. And as required
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - Division 01 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating project meetings with other construction activities.
  - 2. Division 01 Section 01 32 16.13 "CPM Schedules" for requirements for CPM scheduling and reporting progress of work.
  - Division 01 Section 01 33 00 "Submittal Procedures" for submitting the Construction Schedule or CPM Schedule.
  - **4.** Division 01 Section 01 35 26 "Government Safety Requirements specifies the requirements for safety plans, reports, and investigation submittals.
  - 5. Division 07 Section 07 54 16 "PVC Roofing" for pre-construction conferences.

# 1.3 PRE-CONSTRUCTION CONFERENCE

- A. The Contractor will attend a pre-construction conference before starting construction, as scheduled by the Construction Administrator convenient to the Owner, the Construction Administrator, Architect, and Contractor. This meeting will take place at least fourteen (14) days prior to official Start Date. Hold the conference at the Project Site or another convenient location as directed by the Construction Administrator. The Construction Administrator shall conduct the Pre-construction Conference to review the Contractor and Subcontractor responsibilities and personnel assignments.
- **B.** Attendees: Authorized representatives of the Construction Administrator, Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; agency; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including the following:
  - 1. Tentative construction schedule.
  - 2. Critical work sequencing.
  - 3. Progress meeting schedule.
  - 4. Designation of responsible personnel.
  - 5. Procedures for processing field decisions and Change Orders.
  - 6. Procedures for processing Applications for Payment.
  - 7. Distribution of Contract Documents.
  - 8. Submittal of Shop Drawings, Product Data, and Samples.

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- 9. Preparation of record documents.
- 10. Use of the premises.
- 11. Parking availability.
- 12. Office, work, and storage areas.
- 13. Equipment deliveries and priorities.
- 14. Safety procedures.
- 15. First aid.
- 16. Security.
- 17. Housekeeping.
- 18. Working hours.
- 19. Coordination with Audio Visual and Telecommunications.

# 1.4 PRE-INSTALLATION/CONSTRUCTION CONFERENCES

- A. The Contractor will schedule a pre-installation conference(s) at the Project Site before each construction activity that requires coordination with other construction. The Contractor shall be responsible to notify in writing the Construction Administrator and the appropriate Subcontractor(s), etc., of the date and time of all Pre-installation/Construction Conferences. Notification shall be at least seven (7) days, prior to the Conference. The Contractor shall be responsible for coordination and attendance of all Subcontractors, etc., involved in or affected by the installation for all Pre-installation/Construction Conferences.
- **B.** Attendees: The Construction Administrator, Contractor, Subcontractors, Owner and Architect, the installer and representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. The Contractor shall advise all attendees of the scheduled Pre-installation/Construction Conferences dates.
- C. Agenda: Review the progress of other construction activities and preparations for the particular activity under consideration at each Pre-installation/Construction Conference, including but not limited to the following requirements:
  - 1. Contract Documents.
  - 2. Options.
  - 3. Related Change Orders.
  - 4. Purchases.
  - 5. Deliveries.
  - 6. Shop Drawings, Product Data, and quality-control samples.
  - 7. Review of mockups.
  - 8. Possible conflicts.
  - 9. Compatibility problems.
  - 10. Time schedules.
  - 11. Weather limitations.
  - 12. Manufacturer's recommendations.
  - 13. Warranty requirements.
  - 14. Compatibility of materials.
  - 15. Acceptability of substrates.
  - 16. Temporary facilities.
  - 17. Space and access limitations.
  - 18. Governing regulations.
  - 19. Safety.

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- 20. Inspecting and testing requirements.
- 21. Required performance results.
- 22. Recording requirements.
- 23. Protection.
- D. The Construction Administrator will record significant discussions and agreements and disagreements of each Preinstallation/Construction Conference, and the approved schedule. The Construction Administrator will promptly distribute the record of the Pre-installation/Construction Conference to all attendees.
- E. The Contractor shall not proceed with the installation/construction if the conference cannot be successfully concluded. The Contractor shall be responsible to initiate whatever actions are necessary to resolve impediments to performance of Work and schedule and reconvene another Pre-installation/Construction Conference at the earliest feasible date. Failure of the contractor to resolve impediments to the performance of the work will not result in an extension of days.

#### 1.5 PROGRESS MEETINGS

- A. The Construction Administrator will conduct progress meetings, bi-weekly, at the Project Site or at regular intervals as agreed upon at the Pre-construction Conference. The Construction Administrator will notify the Owner, the Architect, and the Contractor of the scheduled Progress Meeting dates. Coordinate dates of Progress Meetings with preparation of Application for Payment requests.
- B. Attendees: In addition to representatives of the Contractor, Construction Administrator, Owner and the Architect, subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities may be requested to attend these meetings on an as needed basis. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work. The Contractor shall include the site superintendent as a minimum.
- C. Agenda: Progress Meetings shall review and correct or approve minutes of the previous Progress Meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
  - 1. Construction Schedule or CPM Schedule: Review progress since the last Progress Meeting. Determine where each activity is in relation to the required Contractor's "Construction Schedule" or "CPM Schedule" and whether each activity is on time or ahead or behind Schedule. Determine how Work that is behind Schedule will be expedited; secure commitments from parties involved to do so. Discuss whether Schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
  - 2. Review the present and future needs of each entity present, including the following:
    - a. Interface requirements.
    - b. Time.
    - c. Sequences.
    - d. Status of submittals.
    - Deliveries. e.
    - f. Off-site fabrication problems.
    - Access. g.
    - h. Site utilization.
    - Temporary facilities and services. i.
    - Hours of work. j.
    - k. Hazards and risks.
    - I. Housekeeping.
    - m. Quality and work standards.
    - Change Orders. n.
    - Documentation of information for payment requests.

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**D. Reporting:** The Construction Administrator will distribute minutes of the meeting to each party present, promptly and before the next scheduled meeting, and to parties who should have been present.

# 1.6 SUBCONTRACTOR/COORDINATION/SAFETY MEETINGS

- A. The Contractor shall conduct Subcontractor/coordination meetings.
- **B.** The Contractor shall conduct a separate safety meeting after the safety plan is submitted. The Contractor shall take meeting minutes. These minutes shall be made available upon request. The Contractor shall notify the Construction Administrator of the times and dates of these meetings, who may elect to attend these meetings as an observer when necessary. A minimum of one safety meeting will be held per month.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

**END OF SECTION 01 31 19** 

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# **PART 1 - GENERAL**

#### 1.1 **RELATED DOCUMENTS**

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the preparation, submittal, and maintenance of the Contractor's computerized progress schedule, reporting progress of the Work, and Contract time adjustments, including the following:
  - Preliminary schedule.
  - 2. Baseline schedule.
  - Two (2) week look ahead schedules.
  - 4. Schedule revisions.
  - 5. Recovery schedules.
  - 6. Narratives.
  - 7. Schedule time extensions.
- The above listed Project schedules shall be used for evaluating all issues related to time for this Contract. The Project schedules shall be updated in accordance with the requirements of this Section to reflect the actual progress of the Work and the Contractor's current plan for the timely completion of the Work. The Project schedules shall be used by the Owner and Contractor for the following purposes as well as any other purpose where the issue of time is relevant:
  - 1. To communicate to the Owner the Contractor's current plan for carrying out the Work;
  - 2. To identify work paths that are critical to the timely completion of the Work;
  - To identify upcoming activities on the Critical Path(s);
  - 4. To evaluate the best course of action for mitigating the impact of unforeseen events;
  - **5.** As the basis for analyzing the time impact of changes in the Work;
  - 6. As a reference in determining the cost associated with increases or decreases in the Work;
  - 7. To identify when submittals will be submitted to the Owner;
  - To prioritize the Owner's review of submittals;
  - 9. To document the actual progress of the Work;
  - **10.** To evaluate resource requirements of the Contractor and the Owner;
  - 11. To integrate the Work with the operational requirements of the Owner's facilities;
  - **12.** To facilitate efforts to complete the Work in a timely manner.
  - **13.** To document the history of the Work.
- B. Refer to the General Conditions and the Agreement for definitions and specific dates of Contract Time.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - Division 01 Section 01 11 00 "Summary of Work" specifies the scope of work for the various phases, requirements regarding the Contractor's use of premises, occupancy requirements, products ordered in advance, and Owner furnished products.
  - 2. Division 01 Section 01 25 00 "Substitution Procedures" specifies requirements for handling requests for equals and substitutions.
  - Division 01 Section 01 26 00 "Contract Modification Procedures" specifies requirements for handling and processing contract modifications.
  - Division 01 Section 01 29 76 "Progress Payment Procedures" specifies requirements for submitting Schedule of Values and Application for Payments.

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- 5. Division 01 Section 01 31 00 "Project Management and Coordination" specifies requirements for coordinating construction operations.
- Division 01 Section 01 31 19 "Project Meetings" specifies requirements for submitting and distributing meeting and conference minutes.
- Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for submitting the monthly 7. computerized progress schedule.
- Division 01 Section 01 45 00 "Quality Control" specifies requirements for submitting inspection and test reports.
- Division 01 Section 01 50 00 "Temporary Facilities and Controls" specifies requirements for temporary utilities, support facilities, and security protection.
- 10. Division 01 Section 01 60 00 "Product Requirements" specifies requirements for submitting the list of products.
- 11. Division 01 Section 01 77 00 "Closeout Procedures" specifies requirements for Contract closeout.

#### 1.3 **DEFINITIONS**

- A. Critical Path Method (CPM): A method of planning and scheduling a construction project where activities are arranged based on activity relationships and network calculations determine when activities can be performed and the critical path of the Project.
- B. Critical Path: The longest continuous chain of activities through the network at a given data date for the Schedule to a Contract Milestone or Contract Completion. Where the path to a specific Milestone has become negative, the Critical Path shall be the longest continuous chain of activities with the greatest amount of negative float.
- C. Near Critical Path: Any continuous series of activities through the network to the Contract Milestone or the Contract Completion Date where the Total Float of the activity at the data date along that path is within fifteen (15) days of the Total Float possessed by the activity at the data date along the Critical Path.
- D. Network Diagram: A graphic diagram of a network schedule, showing the activities and activity relationships.
- E. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
  - 1. Critical activities are activities on the critical path.
  - Predecessor activity is an activity that must be completed before a given activity can be started.
- **F.** Event: An event is the starting or ending point of an activity.
- **G. Milestone:** A key or critical point in time for reference or measurement.
- H. Float: Is the measure of leeway in activity performance. Accumulative float time belongs to the Owner.
  - Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
  - Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned project completion date.
- Total Float: The number of days from the late finish date (LF) to the early finish date (EF) of an activity at a given data date for the Schedule. When the LF is later than the EF, the Total Float shall be positive. When the LF and the EF are the same, the Total Float shall be zero. When the LF is earlier than the EF, the Total Float shall be negative. Unless otherwise specified all references to "float" shall mean "Total Float."
- J. Fragnet: The sequence of new activities and/or activity revisions, logic or resource changes that are proposed to be added to the existing schedule to demonstrate the influence of impacts to the schedule. The Fragnet shall identify the predecessors to the new activities and demonstrate the impacts to successor activities.

#### 1.4 **QUALITY ASSURANCE**

# **Construction Scheduler:**

The Contractor is required to employ or retain the services of an individual skilled in construction scheduling ("Construction Scheduler"). For projects with a Contract value greater than five (5) million dollars, the Construction Scheduler shall have at least five (5) years of verifiable experience as the person primarily responsible for preparing and maintaining detailed project schedules on projects of the same or

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- similar size and nature as this project. The Construction Scheduler is required to attend meetings pertaining to scheduling and progress of the work including all progress meetings.
- 2. Within five (5) days after the Notice of Award, the Contractor shall provide a statement to the Owner with the following:
  - a. Identification, qualifications, and experience of the Contractor's Construction Scheduler and all other members of the Contractor's scheduling staff.
  - **b.** References of not less than two (2) previous projects on which the Contractor's Construction Scheduler has utilized CPM scheduling.
- 3. The Owner reserves the right to disapprove any Construction Scheduler candidate proposed for the project and/or remove, without rights to work on the project, any member of the Contractor's scheduling staff that is, in the Owner's opinion, not qualified. In case of disapproval, the Contractor shall resubmit the qualifications and references of the proposed alternate Construction Scheduler within ten (10) days. The Contractor must have its Construction Scheduler approved prior to the issuance of the Notice to Proceed and the submission of any schedule.
- 4. Should the Construction Scheduler leave the employ of the Contractor or be re-assigned or relieved of his/her responsibilities as the Construction Scheduler on the project, the Contractor will be required to submit the qualifications of the proposed replacement Construction Scheduler within 10 days after the date the former Construction Scheduler is no longer responsible for his/her duties on this Project.

# B. Scheduling Software:

- 1. For Contracts greater than **five (5) million** dollars, the Contractor shall use the latest version of Primavera Project Planner as the scheduling software system for use on this Project.
- The Contractor shall provide one (1) licensed copy of the scheduling software to the Owner's CA for their
  use, registered in the Owner's name, complete with the entire manufacturer's manual, within five (5) days
  after the Contract award. The software manuals and license shall become the permanent property of the
  Owner.

# 1.5 CPM SCHEDULE FORMAT/CONTENT

- **A.** Format: All Schedules required by this section shall be computer generated, critical path method (CPM) networks utilizing the precedence diagram method of scheduling.
- **B.** Electronic Schedule Naming: The Contractor shall not submit any two (2) schedule files with the same file name. File names shall be in accordance with the following requirements:
  - 1. Proposed/Final Preliminary Schedules shall be named P001, P002, P003, etc.
  - 2. Proposed/Final Baseline Schedules shall be named B001, B002, B003, etc.
  - **3.** Final Updated Schedules shall be named U001, U002, U003, etc. Any revisions that are required at a particular update on a data date shall be numbered UA01, UB01, UC01, etc.
- C. Activity Identification: Each activity in the Project schedules shall have an activity Identifier (activity ID). The Contractor is encouraged to utilize the activity ID to contain a structure enabling easy identification of work type, location, subcontractor, etc. The activity ID of an existing activity shall not be modified or assigned to another activity.
- D. Activity Description: The activity description shall identify the scope of the activity and shall include a verb or work function (i.e. form, pour, execute, etc.), an object (i.e. slab, footing, wall, etc.), and location (i.e., first floor, roof, etc.). There shall not be any two activities with the same activity description. It shall not be necessary to investigate activity code assignments or logic relationships to identify the scope of an activity. For example, the description "Pour Footing" will not be acceptable. The description "Pour Footing West Wall, Section 2" will be acceptable. The terms "Miscellaneous," "Misc." and other vague adjectives shall not be used in an activity description. The Contractor shall standardize the use of terms and their spelling in all activity descriptions. Abbreviation used in activity descriptions shall be consistent with the abbreviations used throughout the Contract Documents and summarized on the Contract Drawings.
- E. Work Activities: The Contractor shall include activities for work in the following list:
  - 1. Mobilization.
  - 2. All required submittals and submittal review.
  - 3. Equipment and materials procurement/fabrication/delivery.
  - 4. Installing/operating temporary heat and utilities.

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- 5. Preliminary testing of equipment, instrumentation and controls.
- 6. Final testing, including preparation time.
- 7. Substantial Completion: Substantial completion activity shall meet all requirements set forth in Division 01 Section 01 77 00 "Closeout Procedures".
- **8.** Punch list work.
- 9. Operation and maintenance training.
- 10. Demobilization.
- 11. Final cleaning.
- 12. Issuance of Certificate of Occupancy.
- 13. Project Specific Issues (If Warranted).
- **F. Maximum Activity Durations:** The Contractor shall prepare schedule utilizing activity durations in terms of days. Do not exceed twenty-one (21) day duration on activities except concrete curing, submittal review and equipment fabrication and deliveries. Where duration of continuous work exceeds twenty-one (21) days, subdivide activities by location or other sub-element of the work. At the request of the Owner, the Contractor shall substantiate the need for specific activities having longer durations than stated herein. If the Contractor fails to substantiate this need, then the Contractor shall modify activity durations and the corresponding work scope of the activities to the satisfaction of the Owner.
- G. Activity Dates: Early and late start and finish dates of activities shall be calculated for each activity based upon the schedule data date, actual dates, schedule logic, schedule constraints, calendars and original duration or remaining duration, in accordance with the software to calculate incorrect early and late, start and finish dates, the Contractor shall be responsible to identify all such errors and to determine correct dates consistent with the parameters specified in this Section.
- H. Activity Predecessors and Successors: Every activity shall have logically assigned predecessors and successors in conformance with the requirements of this Section. Unless otherwise specified, Notice to Proceed shall be the only activity in the Project Schedules without a predecessor. Unless otherwise specified, Acceptance and each Contract Milestone(s) shall be the only activity in the Project Schedules without a successor.
- I. Activity Constraints: Activity Constraints can affect activity float calculations and shall not be used unless accepted by the Owner. The imposition of a date constraint on any activity shall only be permitted when the Contractor demonstrates the need for such a constraint to the satisfaction of the Owner.
- J. Imposed Project Finish Date: The imposed project finish date shall be the Contract Completion date, or if the Contractor plans an early completion date, the date it plans to complete the Work.
- K. Negative Float: Negative float is calculated when the user imposes a finish date or other constraint on the schedule and when an activity can only finish after its late finish date. The Contractor shall remove the imposed finish date and/or constraint causing the negative float when directed to do so by the Owner.
- L. Activity Codes: The schedules shall contain activity code classifications and code values. The coding structure shall, at a minimum, include code fields for the following: Phase, Area, Location, Type of Work, Submittal/Procurement, Construction, Responsibility, Original/Extra Work, and Division. All activities in the schedule must have non-blank values for the required codes.
- M. Calendars: The planning unit for the Work shall be days. The global calendar shall contain all union holidays. The Contractor shall coordinate holidays to be observed with the Owner and incorporate them into the schedule as non-working days. This Calendar shall be a 5-day work week, Monday through Friday. Every activity shall be assigned a working day calendar based on when the activity is planned to occur and when it is contractually permitted to occur. The Contractor shall define and submit additional working day calendars for acceptance by the Owner that are necessary for completion of work in accordance with the requirements of the Contract Documents. Only Owner defined or Owner accepted working day calendars shall be utilized in the Project Schedules.
- **N.** Logic: The Contractor shall be responsible for developing the logic of the Preliminary, Baseline and Recovery Schedules and for updating that logic each month to accurately reflect the progress of the Work to-date and the Contractor's current plan for the timely completion of the Work.
  - 1. The following criteria shall form the basis for assembly of the schedule logic:
    - **a.** Which activity must be completed before a subsequent activity can be started?
    - **b.** Which activities can be done concurrently?

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- c. Which activities must be started immediately following a completed activity?
- d. What major economic facility or manpower restrictions are required for sequencing these activities?
- 2. All paths through the Project schedules shall proceed in the direction representing the progression of time. Activity lag duration shall not have a negative value unless the Contractor substantiates to the satisfaction of the Owner that this is the best representation of reality. The use of activity lags shall be kept to a minimum. The Contractor shall eliminate lags by creating new activities, when the creation of new activities will perform the same function of the lag and when requested to do so by the Owner.
- Redundant ties to preceding activities in a sequential series of activities will not be permitted. For example, if activity C is the successor in a finish-start relationship to activity B, and activity B is the successor in a finish-start relationship to activity A, then activity A shall not have a redundant finish-start relationship to activity C. A tie representing a different constraint will not be considered redundant. For example, a logic tie showing that the completion of the work scope of a predecessor is required before the successor can start is different from a logic tie representing a resource limitation and will not be considered redundant.
- The Contractor is required to use manpower and equipment restraints, separately noted, to optimize and level manpower and equipment requirements. Such resource leveling shall reflect a reasonable plan for accomplishing the Work. The individual activities involved may be sequenced within the limits of the available Total Float. However, when this leveling technique is used in establishing the initial schedule, it shall be reflected in the logic with restraints identified as "restraint for manpower or equipment leveling purposes only." Critical or near Critical Paths resulting from the use of manpower restraints shall be kept to a minimum.
- 5. All activities with resource restraints shall be supplemented with resource loading information as noted in Paragraph G.
- The Contractor shall correct all incorrect logic relationships in the Schedule Updates to eliminate any outof-sequenced logic. The Contractor shall make all changes in the logic or other adjustments found to be incorrect by the Owner.
- O. Progress Data: Actual start and finish dates shall not be automatically updated by default mechanisms that may be included in the CPM scheduling software systems. The primary source of actual starts and finishes and period percentage completes shall be by field verification. The Contractor is to insure that progress is based of a current estimate of remaining duration to complete the Work and not the activity percent complete which calculates the remaining duration based on the original estimated duration.

# P. Submittals:

- 1. Each submission that is required by the Contract Documents shall have a corresponding activity, for the preparation and review and approval at the submission. When the Contractor plans on making a submission in parts, each part of the submission shall have corresponding preparation and review and approval activities.
- 2. The timing, sequencing and duration of all submitted review and approval activities shall be in accordance with the Contract Documents.
- 3. All submissions designated "Revise and Resubmit" shall require that the Contractor insert new submittal preparation and review and approved activities with appropriate logic into the schedule.
- When submittal receives a partial approval and the partial approval is sufficient to enable the commencement of a successor activity, then the original submittal activity shall be broken down into multiple activities as necessary to accurately reflect the logic of the Contractor's current plan.
- When multiple items are included in a single submittal, the "Review and Approve" activity for the submittal shall be a predecessor to every activity representing the fabrication and delivery of any of the materials.
- Q. Delivery Activities: The schedules shall include activities for all fabrication and delivery work except for short lead time items. "Short lead time" shall be defined as a period of fourteen (14) days or less from placement of order to delivery of material to the project site. Activities representing the delivery of materials or equipment for more than one (1) installation activity will permitted in accordance with the following conditions.
  - The material delivery activity shall be a predecessor to the first activity representing the installation of the material in each area.
  - When partial deliveries are received and those deliveries are adequate to enable the commencement of some, but not all, successor activities, then the original delivery activity shall be broken down into multiple activities as necessary to accurately reflect the logic of the Contractor's current plan.

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- **R.** Inspections/Testing: The Contractor shall include an activity for each inspection and test required by the various officials and agencies, including the Building Inspector, and Fire Marshall. The Contractor shall schedule these activities in accordance with the availability of the corresponding agency/official.
- S. Progress Override/Retained Logic: The Contractor shall use retained logic to calculate all schedules required by this section. The use of progress override is not allowed without prior approval of the Owner.
- T. Weather Days Allowance: The Contractor shall include as a separate identifiable activity on the Critical Path, and activity labeled "Weather Days Allowance." Insert this activity immediately prior to the substantial completion milestone.
  - 1. The Contractor shall be fully responsible for determining the number of weather delay days to be included in the CPM Schedule. This determination shall be based on the normal anticipated weather for the project location and the nature of the project work. The CPM Schedule shall be based on the contractor's determined weather delay allowance, immediately prior to the Substantial Completion milestone.
  - The <u>minimal</u> allowed duration of the Weather Days Allowance shall be calculated as follows (decimals rounded to nearest whole number):

Contract Time
(Calendar Days) multiplied by 7 equals Weather Days Allowance (Calendar Days)
365

- 3. The Contractor shall insert an activity in the Critical Path to reflect weather day occurrences when weather days are experienced and accepted by the Owner. Identify this activity as a weather delay.
- 4. The Contractor shall reduce duration of Weather Days Allowance activity as weather delays are experienced and inserted into the schedule. Remaining weather days in Weather Day Allowance at completion of project is considered float. Weather delay, when justified, are considered allowable, non compensable.
- U. Regulatory/Third Party Approvals: The Contractor shall include activities in its schedule for all approvals required by regulatory agencies or other third parties.
- V. Resource Loading: The Contractor shall resource load the schedules when required by this Specification and/or if requested to do so by the Owner. When required, the schedules shall be resource loaded for both the Contractor and all of its subcontractors as detailed below or as otherwise directed by the Owner. The Contractor may propose additional or alternative resource loading for the Owner review and acceptance. Defining a resource shall consist of identifying the resource name, resource description, unit of measure, and calendar assignment.
  - 1. Labor Resources: Labor shall refer to all craft labor including foreman. Labor shall be measured in person-days. The labor resource definitions shall be consistent with the subcontractor work scope.
  - 2. Construction Equipment Resources: The planned use of equipment requiring a licensed operator shall be reflected in equipment resource assignments to activities.
  - 3. Limits on Resources: The Contractor shall indicate in its Narrative the expected amount of resource and shall define the normal or expected usage along with a maximum limit available to the Contractor. Resource limits may vary for different stages of the work. Resource limits shall be revised to reflect the Contractor's current plan for the timely completion of the work.

# W. Activity Logs:

- Activities that are modified or added by change order shall be identified in the activity log. The change order number, as issued by the Owner, and the date the activity was modified or added shall be clearly recorded.
- Activities affected by logic changes, resource changes, duration changes and calendar changes shall be identified in the activity log. The date the activity was modified, the nature of the change and the reason for the change shall be clearly recorded.

# 1.6 PRELIMINARY SCHEDULE AND PRELIMINARY SCHEDULE UPDATES

- **A.** For projects with a construction cost estimate over five (5) million dollars, the Contractor shall submit a Preliminary Schedule and Preliminary Schedule Updates. The Notice to Proceed will not be issued and the Contractor will not be allowed to start work at the Project site until the Preliminary Schedule has been submitted and accepted.
- **B.** The Preliminary Schedule shall contain a detailed plan of operations for the first 90 days of Work after receipt of the Notice to Proceed.

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- C. The Construction Administrator and Contractor shall meet after receipt of Preliminary Schedule to review and make necessary adjustments. Contractor shall submit a revise Preliminary Schedule incorporating the adjustments with five (5) days after meeting.
- D. All Work contemplated beyond the first ninety (90) days shall be shown in sufficient detail such that the Critical Path and all Contract Milestones may be identified.
- E. The Preliminary Schedule shall be updated monthly during first ninety (90) days after issuance of the Notice to Proceed. The first update of the Preliminary Schedule shall show the progress on the actual Notice to Proceed date and shall be submitted to the Construction Administrator within five (5) days after the issuance of the Notice to Proceed. Subsequent updates shall show the progress through the last day of the month and shall be submitted to the Construction Administrator by the fifth business day of each month.
- Preliminary Schedule Update revisions that are required as a result of review comments by the Construction Administrator shall be submitted within five (5) days of the Contractor's receipt of the Construction Administrator's comments. The data date of the revised Preliminary Schedule Update shall remain on the first day of the month.
- G. The Contractor shall not be permitted to make any schedule revisions (besides progress) to the Preliminary Schedule Update unless approved by the Construction Administrator. When schedule revisions are required, the Contractor shall submit a Schedule Revision per Article 1.11.

#### 1.7 **BASELINE SCHEDULE**

- A. For projects with a construction cost estimate over five (5) million dollars, the Contractor shall submit the proposed Baseline Schedule to the Construction Administrator for all the work of the project within forty-five (45) days after issuance of the Notice to Proceed. The Accepted Preliminary Schedule shall be incorporated unchanged, as first ninety (90) days activity in the Contractor's Baseline Schedule.
- B. The proposed Baseline Schedule shall show sequence and interdependence of all activities required for complete performance of all Work, beginning with date of Notice to Proceed and concluding with date of final completion of the Contract. The Baseline Schedule shall depict the work as bid and as planned as of the Notice to Proceed. The data date shall be the actual date of the Notice to Proceed.
- C. The Construction Administrator and the Contractor shall meet after the Construction Administrator's receipt of the Baseline Schedule to review and make necessary adjustments. Should adjustments be required, the Contractor shall submit a revised Baseline Schedule within five (5) days after the meeting and receipt of the Construction Administrator's comments. Subsequent follow-up meetings and resubmissions may continue until the Construction Administrator accepts the Baseline Schedule.
- D. The Contractor shall require each major Trade Contractor and major supplier to submit in writing a statement certifying that the major Trade Contractor or major supplier has concurred with the Contractor's Baseline Schedule, the major Trade Contractor's or major supplier's related schedule has been incorporated accurately, including the duration of activities and crew allocations. The definition of a "major Trade Contractor" is one (1) that provides services valued in excess of five (5) percent of the Contract value. The definition of "major supplier" is one (1) that provides material(s) or services valued in excess of one (1) percent of the Contract value. Failure of the Contractor to provide the required information will delay the approval of the Baseline Schedule.

#### **SCHEDULE UPDATES** 1.8

- The Contractor shall update and progress the CPM Schedule through the last day of each month (the Data Date is the first day of the month). Updating and progressing the CPM Schedule shall be completed and submitted by the fifth business day each month. Except as otherwise authorized by the Construction Administrator, monthly submissions received after the due date are considered late.
- B. The first update will consist of the approved Baseline Schedule updated as of the first day of the first month which starts after ninety (90) days from the Notice to Proceed. Subsequent monthly Schedule Updates will be the previous month's approved Schedule Update or approved Revision Schedule updated to reflect progress over the last month. Schedule revisions, apart from updating the status of the remaining durations and percent completes of the various work activities will not be permitted in the Schedule Update.
- The Contractor shall create a copy of the previous month Schedule Update for the purpose of updating and progressing it. The schedule shall be updated to show the work actually accomplished during the preceding month, the actual time consumed for each activity, and the estimated time remaining for any activity that has been started but not completed. The updating of the percent complete and the remaining duration of any activity shall be independent functions; program features that calculate one of these parameters from the other shall be disabled.

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- D. The Contractor shall make the necessary adjustments to the Schedule Update in accordance with the Construction Administrator's Schedule Update review comments and shall re-submit the Schedule Update within five (5) days after receipt of those comments.
- E. The Contractor shall prepare the monthly Schedule Updates every month starting on the month described above through the actual substantial completion date.

#### 1.9 TWO-WEEK LOOK AHEAD SCHEDULES

- A. The Contractor shall be required to produce and submit to the Construction Administrator a Two-Week Look Ahead Schedule, to be updated and submitted the first day of each week. Except as otherwise authorized by the Owner, submissions received after the due date are considered late.
- B. The Two-Week Look Ahead Schedule may be a CPM schedule or a bar chart; it shall be consistent with the previously approved Schedule Update or approved Schedule Revision.

#### 1.10 SCHEDULE REVISIONS

- A. If, at any time, the Contractor alters its logic, original durations, or descriptions, adds activities or activity codes, or in any way modifies the accepted Preliminary Schedule, accepted Preliminary Schedule Update, Baseline Schedule or Schedule Update, the Contractor must notify the Construction Administrator of the change(s), in writing and submit a Revision Schedule to the Construction Administrator for review.
- B. The preparation and submission of Revision Schedules will also be required to reflect any Contract Modifications that were approved and Construction Change Directives that were issued during the preceding period and any extra or changed work that the Contractor has started during the preceding period.
- C. With each Revision Schedule, the Contractor shall submit a written narrative explaining the nature of the change(s), the schedule, the reason for the change(s) and the impact on the schedule as a result of the change(s).
- D. All changes (i.e. duration changes, logic changes, new logic, new or modified activities changes in work sequence, etc.) shall be recorded and a note added to the activity log. The record shall include at a minimum, the date and the reason for the change, and description of the change.
- E. The required Revisions Schedules and Narratives are in addition to the regular Schedule Update. They shall be separate submittals and shall be noted as Schedule Revisions.
- F. Proposed Revision Schedules shall be submitted by the fifth day of the month and shall reflect status as of the first day of the month.
- G. The Construction Administrator and Contractor shall meet after the Construction Administrator's receipt of the Revision Schedule and Narrative to review and make necessary adjustments. Should adjustments be required, the Contractor shall submit a revised Revision Schedule to the Construction Administrator within five (5) days after the meeting and receipt of the Construction Administrator Comments. Subsequent follow-up meetings and resubmissions may continue until after the Construction Administrator accepts the Revision Schedule.
- H. Only upon acceptance of a revision to the Schedule by the Construction Administrator shall the revision be reflected in the next Schedule Update and Two-Week Look-Ahead Schedule.
- The Construction Administrator reserves the right to accept or reject any schedule revisions proposed by the Contractor.

#### 1.11 RECOVERY SCHEDULES

- If, in opinion of the Owner, a Schedule Update indicates that the Contractor has fallen behind schedule, or that a revision in sequence or operations may be necessary for any other reason, the Contractor shall within seven (7) days of receiving a written request to perform "Recovery" from the Construction Administrator, immediately institute all necessary steps to improve his progress and shall submit such revised network diagrams, tabulations, operational plans and any supplementary information, as may be deemed necessary by the Owner, to demonstrate the manner in which an acceptance rate of progress will be regained.
- B. Should the Contractor's "Recovery" efforts not demonstrate an ability to regain an acceptable rate of progress. the Construction Administrator may require the development of a "Recovery Schedule" and the Contractor shall submit the Recovery Schedule within twenty-one (21) days of receiving a written request for the Recovery Schedule from the Construction Administrator. The Recovery Schedule is to be supplemented with resource allocations for every task activity and include time-scaled resource histograms. The resource allocations shall be shown to a level of detail that facilitates report generations based on labor crafts and equipment classes

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for the Contractor and Trade Contractors. The Contractor shall use average composite crews to display the labor loading of onsite construction activities. The Contractor shall optimize and level labor to reflect a reasonable plan for accomplishing the Work of the Contract and to assure that resources are not over allocated in multiple concurrent activities. The time-scaled resource histograms shall show labor crafts and equipment classes to be utilized on the Contract.

- C. In addition to required submittals, the "Recovery Schedule" submission will also include a Narrative as detailed herein, a time-scaled resource histogram and a Monthly Resources Loading Summary Report (tabular) indicating the peak number of resources required for each activity.
- D. The Construction Administrator shall be the sole judge as to whether the Recovery Schedule is sufficiently detailed. Upon acceptance of this Recovery Schedule, it shall form the basis of the new Monthly Schedule Updates going forward.
- E. No additional compensation will be allowed for Recovery Schedules required to overcome delays caused in whole or in part by the Contractor.

#### **NARRATIVES** 1.12

- The Contractor shall prepare and submit a Narrative to accompany the Baseline Schedule, Preliminary Schedule and each Preliminary Schedule Update and Monthly Schedule Update. The Narratives shall include:
  - Identification of the update period, the data date and the schedule file name.
  - 2. A description of the current Critical and Near Critical Paths activities that are supposed to start or to be worked on over the coming month.
  - 3. Changes to the Critical Path, intermediate and completion Milestones
  - Description of problem areas.
  - Current or anticipated delays:
    - a. Cause of delay.
    - **b.** Impact of delay on other activities, Milestones, and completion dates.
    - c. Corrective action and schedule adjustments to correct the delay.
  - **6.** A discussion of work completed during the period.
  - 7. A comparison of the planned versus schedule progress early on and near Critical Path activities that were to have been worked on over the last month.
  - 8. A description of any interdependencies between the Contractor's Schedule and any work by other contractors, third parties, and/or the Owner and its representatives.
  - A description of the current status of float created by any previous or ongoing compensable or excusable delays, whether or not the Contractor has utilized any of this float over the last period by purposefully slowing down (pacing) and any request to utilize this float over the coming period.
  - 10. An explanation of how adverse weather has been addressed in Schedule and an accounting of the Weather Day Allowance delineating the activities incorporated into the Schedule to account of work days lost due to weather and the resultant decrease in the duration of the Weather Day Allowance.
  - 11. A description of planned labor resources to be utilized to complete critical and near Critical Path work as requested by the Construction Administrator.
  - 12. A description of actual and potential equipment resource limitations.

#### 1.13 **NETWORK FILES, GRAPHICAL OUTPUT AND REPORTS**

- A. With each Preliminary Schedule, Preliminary Schedule Update, Baseline Schedule, Schedule Update, Revision Schedule and Recovery Schedule required by these specifications, the Contractor shall submit to the Construction Administrator the following schedule reports/graphics/files:
  - Three (3) compact disc sets that each include:
    - **a.** A compressed back up of the entire schedule.
    - b. Gantt charts in Adobe Acrobat PDF file format, formatted to fit ANSI Size D paper (610mm x 914mm) (24" x 36"), and showing the Activity ID, Activity Description, Original Duration, Remaining Duration, Total Float, Early Start and Finish Dates, and Calendar ID. Types of Gantt Charts to be included are:

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- i. The project critical (longest) path.
- ii. The Project near Critical Path (excluding Critical Path activities).
- iii. All uncompleted work activities as of the data date.
- 2. Reports in Adobe Acrobat PDF file format, formatted to fit 216mm x 279mm (8½" x 11") size paper, to include:
  - a. A listing of all activities, by activity code, with early & late starts and Total Float.
  - **b.** A Claim Digger Report that details all changes between the current schedule submittal and the previous month's update submittal.
  - c. Detailed Predecessor/Successor Report which included a listing of all activities that immediately precede and immediately succeed that activity in the schedule logic.
- **3.** Three (3) paper copies of each Gantt Charts in color and report on the paper size specified above.
- B. Schedule submittals will only be considered complete when all materials have been submitted.

# 1.14 FLOAT/CRITICAL PATH

- **A.** With the exception of the Float described in Paragraphs B and C, Float is not for the exclusive use or benefit of either the Construction Administrator or the Contractor but is an expiring resource available to all parties acting in good faith as needed to meet any Contract Milestone(s).
- **B.** As float is an expiring resource, if the Work is delayed on the Critical Path due to an excusable delay (either compensable or non-compensable) or by any delay for which responsibility has not yet been agreed upon, the Contractor may not use any float created by such delay on any other path without the express written approval of the Construction Administrator or unless at the time of the float consumption a time extension had been issued for the delay that created the float being consumed. Use of such float on any parallel path without the approval of the Construction Administrator shall be construed as a concurrent inexcusable delay to any delay caused by the Construction Administrator.
- C. It is acknowledged and agreed by the Contractor that Construction Administrator caused delays on the project may be offset by Construction Administrator caused time savings (including, but not limited to: Critical Path submittals returned in less time than allowed for in the Contract, approval of substitution requests which result in a savings of time along the Critical Path for the Contractor, etc.). In such an event, the Contractor shall not be entitled to receive an extension of time or delay damages until the Construction Administrator caused time savings are exceeded and the Contract completion date also exceeded.

# 1.15 EARLY COMPLETION

- A. Should Contractor submit a Preliminary Schedule, Baseline Schedule, Schedule Update or Schedule Revision showing Project Completion more than twenty (28) days prior to Contract Completion Date, the Construction Administrator may issue a Change Order, at no cost to Owner, revising the time of performance of Work and Contract completion date to match Contractor's schedule. Contract Milestone dates, if any, shall be adjusted accordingly. The assessment of liquidated damages shall be measured based on the new Milestone and Contract completion dates.
- **B.** Should any monthly Schedule Update show the project completion earlier than current Contract completion date, the Contractor shall show early completion time as schedule activity, identified as "Project Float." This float shall be available for use by either party as per the provisions of Article 1.14. The Owner shall not liable for any damages as a result of utilizing this float.

# 1.16 CONTRACT TIME EXTENSIONS

### A. Mitigation of Delays:

- 1. The Contractor shall be responsible to develop mitigation measures for all delays regardless of responsibility for the delays and to identify all time and cost impacts to the work associated with those mitigation measures. Unless circumstances otherwise require, the Contractor shall not pursue mitigation action for which it expects the Owner to be liable prior to notifying the Owner and receiving Construction Administrator authorization to proceed with the mitigation action. Any action taken by the Contractor prior to receiving approval from the Construction Administrator shall be at the Contractor's risk.
- 2. When the need for mitigation arises to ensure timely completion, the Contractor shall review all uncompleted activities on the Critical and Near Critical Paths to the Contract Completion Date for errors

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- in scope, duration, and logic and for the feasibility of performing in parallel work currently scheduled sequentially.
- 3. Whenever it is possible for the Contractor to mitigate delay without added cost, the Contractor shall do so. The Contractor shall mitigate all delays as efficiently and economically as possible, with the objective of minimizing both the time and cost impact of the delay regardless of responsibility for the delay. The Owner will not be liable for damages which the Contractor could have avoided by reasonable means such as prudent scheduling of the work and judicious handling of forces, equipment or plant. The Owner will not be liable for damages incurred by the Contractor during any period of time when the Contractor has failed to provide notification of delay in accordance with the Contract requirements when having the notification at the specified time could have influenced the Owner's decision or actions.

# B. Time Impact Analysis:

- 1. If the Contractor believes that a proposed change will impact the Project Completion Date or interim Milestones, the Contractor shall submit an analysis with its Change Order Proposal demonstrating the delay to the Critical Path. This analysis shall be in the form of a Time Impact Analysis (TIA).
- 2. The Time Impact Analysis shall consist of: 1) a Fragnet of the portion of the schedule that will be affected by the incorporation of the change, which shall include the new activities, revised logic and durations associated with the proposal change; 2) a narrative explanation of how the proposed change would impact the schedule; 3) an impact schedule which shall be developed by incorporating the Fragnet and required changes, including any delay mitigation measures, into the most recent accepted schedule update and; 4) electronic copies of the Fragnet and impact schedule.
- 3. The Contractor shall submit its TIA in sufficient time to allow it to be incorporated into a Revision Schedule prior to the change order work proceeding, allowing the Owner thirty (30) days after receipt of the TIA and all the supporting information required with the Change Order Proposal to approve or reject the analysis.
- 4. Upon agreement on the schedule impact due to the proposed change and the issuance of a time extension, the Contractor shall incorporate the agreed upon Fragnet/schedule revisions in the next monthly update.
- 5. The Owner reserves the right to have the Contractor proceed with the change order related work without agreeing on the time associated with it and to measure the actual schedule impact via Contemporaneous Period Analysis.
- 6. In cases where the Contractor has not submitted a TIA with its Change Order Proposal for a particular proposed change, the Contractor agrees that the particular proposed change has no impact on the Contract Completion Date or interim Milestones and no time extension is required.

# C. Contemporaneous Period Analysis:

- 1. When an accepted Schedule Update indicates the project has been delayed beyond the current Contract Completion Date and the Contractor believes it is entitled to an extension of time, the Contractor shall prepare and submit to the Owner a Contemporaneous Period Analysis (CPA) demonstrating the delay(s) to the Critical Path at the time of the delay, mitigation measures taken or proposed by the Contractor and request an extension of time.
- The Contractor's CPA and time extension request shall be submitted prior to the submission of the next Schedule Update.
- 3. The request shall indicate the amount of time requested, the period when the delay was experienced and an explanation as to the cause of the delay.
- 4. The CPA shall quantify the delay by comparing the completion dates and Milestone dates on an update by update basis, starting with the update just prior to the delaying event and ending with the update just after the conclusion of the delaying event. Only the accepted schedules/Schedule Updates shall be used in the CPA. The CPA shall determine the cause of the delay by correlating slippage with various unforeseen events.
- 5. The CPA will consist of: 1) an update by update accounting of all delay(s) during the period in question; 2) an update by update narrative explanation of how the delay(s) affected the completion date or would have affected the completion date but for other concurrent delay(s); 3) chronologies of the issues affecting the schedule period in question; and 4) a day by day accounting and description of the unanticipated work/work stoppage on the Critical Path and/or path in question; 5) a Gantt chart comparing the asplanned schedule just prior to the start of the delay to the actual as-built for the path(s) in question.
- **D.** The Owner may require the Contractor to correct errors in its TIA or CPA at anytime, whether or not the schedules have been accepted and/or time extension issued and agreed upon. Should the errors affect the

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- outcome of the TIA or CPA, the Owner reserves the right to adjust the time extension accordingly. Generally, a schedule will be found to be in error if it does not properly reflect the sequencing, timing and durations of all the work and required events as well as mitigation efforts contemplated or which should have been contemplated at the time of the data date of the schedule.
- E. Time Extensions will be granted only to the extent that equitable adjustments for the activity or activities affected exceed or exceeded the total or remaining float along the Critical path or activities at the time of the actual delay. Actual delays in activities which do not affect the Critical Path work or which do not move the Contractor's planned completion date beyond the Contract completion date or current completion date as affected by previous delays, will not be the basis for an adjustment to the Contract time. Time Extensions shall not be granted until a delay occurs that is:
  - Beyond control of and without fault of or negligence of the Contractor and the major Trade Contractors or Suppliers at any time.
  - Extends the actual performance of the work beyond the Contract completion date or other specified Interim Milestones.
- E. Should a non-compensable excusable delay be concurrent with one or more compensable delays, the Contractor and Owner agree that the net result is a non-compensable, excusable delay to the extent the delay is caused by the non-compensable event.
- F. The Contractor shall have no claim for damages of any kind, or extensions or increase to the Contract time(s) or Contract Milestone(s), or adjustments of Contract Price on account of any delay, interruption or suspension of the Work or any portion thereof (herein after collectively referred to as "Delay"), due to whatever cause unless the prerequisites of this Subsection are met. The requirements of this Subsection are in addition to and not in lieu of the requirements of any other applicable subsection.

#### REVIEW AND ACCEPTANCE OF PROJECT SCHEDULE SUBMITTALS 1.17

- A. The Construction Administrator shall review schedule submittals for conformance with the requirements of the Contract Documents. Schedule review comments by the Construction Administrator may address whether items of Work are omitted, activity durations are reasonable or that the level of labor, materials, and equipment, the means, methods, timing, and sequencing of the Work are practicable. The planning, scheduling or execution of the Work and the accuracy of any Project Schedule shall remain the sole responsibility of the
- B. During the review of any of the submissions required by this section, if any of the following conditions are discovered the submittal shall be returned by the Construction Administrator without further review for correction and re-submittal:
  - The submittal is incomplete.
  - The submittal does not comply with the specified format.
  - A component of the submittal has not been prepared in accordance with all of the requirements of this section.
  - The quality of the submittal indicates that the Contractor has failed to perform an internal quality control review prior to submission.
  - 5. There is an inconsistency between electronic files and printed material.
- C. It is the Contractor's responsibility to ensure that all Project Schedules are in compliance with all of the requirements of the Contract Documents. The Construction Administrator's failure to return a submittal shall not be construed to mean that the submittal is in compliance with the requirements of the Contract Documents. The Construction Administrator, at its discretion, may choose to complete a submittal review even though the submittal fails to meet one of more of the conditions for rejection stated herein.
- D. The acceptance of any Project Schedule by the Construction Administrator does not constitute acceptance or approval of any change to the requirements of the Contract Documents including but not limited to any mandated construction sequences. The Construction Administrator is not responsible for any erroneous assumptions or information in any Project Schedules regardless of origin.
- E. The Contractor shall be responsible for all delays due to its failure to submit complete submittals in accordance with the requirements of the Contract Documents.
- The Schedule submitted will not be considered acceptable until all of the Construction Administrator's comments are incorporated into the schedule to the Construction Administrator's satisfaction.

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- G. Errors in any Project Schedule accepted by the Construction Administrator, including but not limited to activity durations, relationships between activities, resource allocation or other float suppression techniques that do not accurately reflect the work may be identified at any time and once identified shall be corrected by the Contractor.
- H. Construction Administrator's acceptance of a Schedule Update shall not constitute the approval of a time extension should the Project Completion Date or Contract Milestone(s) be shown as delayed.
- Notwithstanding any review, review comments, acceptance, scheduling assistance or direction to change an/or revise any schedule by the Construction Administrator, the schedules shall at all times be the Contractor's schedule for performing the Work and not be considered as any Construction Administrator direction constituting a change unless the Contractor gives appropriate notice and the other Contract provisions for determining merit and entitlement are met.

#### 1.18 **PAYMENT**

- A. When the Contractor submits its schedule of values in accordance with the General Conditions, it shall include an amount for the scheduling work associated with this section, this cost to be paid in accordance with section (01 29 76).
- B. Failure of the Contractor to submit a Baseline Schedule or Revised Baseline Schedule for any portion of the work in accordance with this specification may result in the withholding all Contract payment until the schedule is submitted to, and accepted for compliance with the specification and reasonableness, by the Construction Administrator.
- C. In the event the project extends beyond the original completion date by more than 30 days, and a time extension is granted to the Contractor, the Construction Administrator may require additional CPM updates which will be paid at the per month cost for the Scheduling Update services.

#### **DISTRIBUTION** 1.19

- A. Distribute copies of the computer generated schedules to Construction Administrator, Architect, Owner, Subcontractors, suppliers, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problem anticipated by projections indicated in schedules.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

**END OF SECTION 01 32 16.13** 

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# **PART 1 - GENERAL**

#### 1.1 **RELATED DOCUMENTS**

 Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for construction photographs.
- **Related Sections:** The following Section contains requirements that relate to construction photographs:
  - Division 01 Section 01 33 00 "Submittal Procedures" specifies general requirements for submitting digital construction photographs.

#### 1.3 **SUBMITTALS**

- A. Photographs: Provide a digital camera to take twenty-four (24) or more photos each time. Deliver two (2) sets of photo files on one (1) CD-ROM or USB flash drive and one (1) set of prints (8x10) to the Construction Administrator for the Department.
- B. Extra Sets: When requested by the Owner, the photographer shall prepare extra sets of prints or CD-ROM/USB flash drive. The photographer shall distribute these directly to the designated parties who will pay the costs for the extra sets directly to the photographer.

#### QUALITY ASSURANCE 1.4

- A. Engage a qualified commercial photographer to take photographs during construction.
- B. Photographer's Qualifications: Photographer shall be an individual of established reputation who has been regularly engaged as a professional photographer for not less than three (3) years.

# **PART 2 - PRODUCTS**

#### 2.1 PHOTOGRAPHIC COPIES

- On the date the work is begun and every thirty (30) days thereafter (until the work is at least 95 percent complete), the Contractor shall have digital photographs of the construction taken by a professional photographer.
- Identification: Label each CD-ROM with project name and date the photographs were taken. With each submittal provide an applied label, rubber-stamped or index sheet with the following information:
  - Name of the Project.
  - 2. Name and address of the photographer.
  - Name of the Architect.
  - 4. Name of the Contractor.
  - Date the photographs were taken.
  - Vantage Point: Description of vantage point, in terms of location, direction (by compass point), and elevation or story of construction.

# **PART 3 - EXECUTION**

#### 3.1 PRECONSTRUCTION PHOTOGRAPHS

- Before starting construction, take digital photos of the site and surrounding properties from different points of view, as selected by the Construction Administrator.
  - 1. Take digital photos in sufficient number to show existing site conditions before starting Work.

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2. Take digital photos of adjacent existing buildings either on or adjoining the property in sufficient detail to record accurately the physical conditions at the start of construction.

# 3.2 PHOTOGRAPHIC REQUIREMENTS

- A. Take twenty-four (24) or more digital photographs monthly, coinciding with the cutoff date associated with each Application for Payment. The Construction Administrator shall select the vantage points for each shot to best show the status of construction and progress since the last photos were taken.
- B. As the digital photographs are a record of the work progress, they shall be taken each month, whether or not they show work done during the preceding month. Deliver the CD-ROMs and prints within ten (10) days of their taking.
- C. Provide and coordinate the use of photographic software to assure that the photos are viewable by all interested parties.

END OF SECTION 01 32 33

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# **PART 1 - GENERAL**

## 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- **A.** This Section includes administrative and procedural requirements for submittals required for performance of the Work, including but not limited to the following:
  - 1. Submittal schedule.
  - 2. Shop Drawings.
  - 3. Product Data.
  - 4. Samples.
  - 5. Quality assurance submittals.
  - 6. Proposed "Substitutions/Equals".
  - 7. Warrantee samples.
  - 8. Coordination Drawings.
  - 9. O & M Manuals
- **B.** Administrative Submittals: Refer to other Division 01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
  - 1. Permits.
  - 2. Applications for Payment.
  - 3. Performance and payment bonds.
  - 4. Contractor's construction schedule.
  - 5. Daily construction reports.
  - 6. Construction Photographs.
  - 7. Insurance certificates.
  - 8. List of subcontractors.
  - 9. Subcontractors/Suppliers FEIN number's and Connecticut tax registration number.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 25 00 "Substitution Procedures" specifies requirements for submittal of requests for equals and substitutions.
  - 2. Division 01 Section 01 29 76 "Progress Payment Procedures" specifies requirements for submittal of the Schedule of Values.
  - 3. Division 01 Section 01 31 00 "Project Management and Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
  - **4.** Division 01 Section 01 31 19 "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.
  - 5. Division 01 Section 01 32 16 "Construction Progress Schedules" for requirements for construction scheduling and reporting progress of work.
  - **5.** Division 01 Section 01 32 16.13 "CPM Schedules" for requirements for CPM scheduling and reporting progress of work.
  - **6.** Division 01 Section 01 32 33 "Photographic Documentation" specifies requirements for submittal of periodic construction photographs.
  - 7. Division 01 Section 01 35 26 "Government Safety Requirements specifies the requirements for safety plans, reports, and investigation submittals.

- **8.** Division 01 Section 01 45 00 "Quality Control" specifies requirements for submittal of inspection and test reports and mockups.
- **9.** Division 01 Section 01 77 00 "Closeout Procedures" specifies requirements for submittal of Project Record Documents and warranties at project closeout.
- 10. Division 01 Section 01 78 30 "Warranties and Bonds".
- **11.** Division 01 Section 01 81 13 "Sustainable Design Requirements" specifies requirements for submittal of documentation required to support LEED or Green Globes certification.
- **12.** Division 01 Section 01 91 00 "Commissioning" specifies requirements for submittal of quality assurance documentation related to commissioning.

# 1.3 DEFINITIONS

- **A.** Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended and as identified in the Specification Divisions 02 through 49.
  - 1. Preparation of Coordination Drawings is specified in Division 01 Section 01 31 00 "Project Management and Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
- **B.** Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
- **C.** Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

### 1.4 SUBMITTAL PROCEDURES

LEED Building Submittal Requirements:

The contractor or subcontractor shall submit the following LEED Building Certification Items:

- 1. A completed LEED Building Materials Certification Form (Sample Included at the end of this section). Information to be supplied for this form shall include:
  - a. Material cost(s) for the building materials included in the contractor's or subcontractor's work. The material costs shall not include costs associated with contractors or subcontractors' labor or equipment.
  - b. The amount of post consumer and/or post industrial recycled content in the supplied products
  - c. The location of origin and location of manufacturer for the supplied products
  - d. The amount of FSC Certified wood products used.
  - e. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the product information supplied on the LEED Building Materials Certification Form.
- 2. Product cut sheets for all materials that meet the LEED Building Performance criteria identified in each specification.
- 3. Documentation for all new wood products, including FSC Certified. Provide vendor invoices for all permanently installed wood products, FSC Certified or not. Each wood product must be identified on a line-item basis, FSC products must be identified as such on a line item basis, the dollar value of each line item must be shown, the vendors Chain-of-Custody certificate number must be shown on any invoice that includes FSC products.
- 4. Material Safety Data Sheets (MSDS) for all applicable products. Applicable products include but are not limited to adhesives, sealants, carpets, paints, coatings, flooring systems, and composite wood materials. MSDS shall indicate the Volatile Organic Compound (VOC) content of products submitted (if an MSDS sheet does not contain the VOC content, manufacturer letters or product data sheets must be provided that indicate the VOC contents).
- 5. The LEED Building Submittal information shall be assembled into one package per specification section (or per subcontractor) and sent to the Architect for review. Incomplete or inaccurate LEED Building submittals may be used as the basis for the Architects rejection of products or assemblies.

- **A.** Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
    - **a.** The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
    - b. The Architect reserves the right to reject incomplete submitted packages.
  - 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for re-submittals.
    - **a.** Allow fourteen (14) days for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
    - **b.** If an intermediate submittal is necessary, process the same as the initial submittal.
    - **c.** Allow fourteen (14) days for reprocessing each submittal.
    - **d.** No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.
- **B.** Submittal Preparation: Place a permanent label, title block or 8-1/2 inches x 11 inches cover page approved by the Architect, on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
  - 1. The minimum number of copies required for each submittal shall be seven (7) or as determined otherwise at the pre-construction conference or by the Construction Administrator.
  - 2. Provide a space approximately 4 inches by 5 inches on the label, beside the title block or on the cover page on Shop Drawings to record the Contractor's review and approval markings and the action taken.
  - 3. Include the following information on the label for processing and recording action taken.
    - a. Project Name and State of Connecticut Project Number.
    - b. Date.
    - c. Name and address of the Architect, Construction Administrator, and Owner Representative.
    - d. Name and address of the Contractor.
    - e. Name and address of the subcontractor.
    - f. Name and address of the supplier.
    - g. Name of the manufacturer.
    - h. Number and title of appropriate Specification Section.
    - i. Drawing number and detail references, as appropriate.
    - j. Indicate either initial or resubmittal.
    - k. Indicate deviations from Contract Documents.
    - I. Indicate if "equal" or "substitution".
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. Copy the Construction Administrator on the transmittal. The Architect will return all submittals to the Contractor after action is taken with a complete copy of the submittal package and one complete copy of the submittal package. The Architect will not accept submittals received from sources other than the Contractor.
  - 1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.

#### 1.6 SUBMITTAL SCHEDULE

- **A.** After development and review by the Owner and Architect acceptance of the Contractor's Construction or CPM schedule prepare a complete schedule of submittals. Submit the schedule to the Construction Administrator within thirty (30) days of Contract Award.
  - 1. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractor's Construction or CPM Schedule.
  - 2. Prepare the schedule in chronological order. Provide the following information:
    - a. Schedule date for the initial submittal.
    - **b.** Related section number.
    - c. Submittal category (Shop Drawings, Product Data, or Samples).
    - d. Name of Subcontractor.
    - e. Description of the part of Work covered.
    - f. Scheduled date for resubmittal.
    - g. Scheduled date for the Architect's final release of approval.
- B. Submittal Schedule: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Architect and additional time for handling and reviewing submittals required by those corrections.
  - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's Contractor's Construction or CPM Schedule.
  - 2. Initial Submittal: Submit concurrently with start-up construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
  - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
    - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
- **C.** Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Submit all submittal items required for each specification section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
  - 3. Submit action submittals and informational submittals required by the same specification section as separate packages under separate transmittals.
  - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
    - **a.** Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination with related submittals not yet received. Additional time will be required if processing must be delayed to permit review of related subsequent submittals.
  - 2 Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal
  - 3. Resubmittal Review: Allow fifteen (15) days for review of each resubmittal.

- 4. Mass Submittals: Six (6) or more submittals in one (1) day or twenty (20) or more submittals in one (1) week. If "Mass Submittals" are received, Architect's review time stated above may be extended as necessary to perform proper review. Architect will review "Mass Submittals based upon priority determined by Architect after consultation with Owner and Contractor.
- **E. Distribution:** Following response to the initial submittal, print and distribute copies to the Construction Administrator, Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
  - 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- **A. Schedule Updating:** Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

# 1.7 DAILY CONSTRUCTION REPORTS

- **A.** Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Construction Administrator at weekly intervals:
  - 1. List of subcontractors at the site.
  - 2. Approximate count of personnel at the site.
  - 3. High and low temperatures, general weather conditions.
  - 4. Accidents and unusual events.
  - 5. Meetings and significant decisions.
  - 6. Stoppages, delays, shortages, and losses.
  - 7. Meter readings and similar recordings.
  - 8. List of equipment on site and identify if idle or in use.
  - 9. Orders and requests of governing authorities.
  - 10. Change Orders received, start and end dates.
  - 11. Services connected, disconnected.
  - 12. Equipment or system tests and startups.
  - 13. Partial Completion's, occupancies.
  - 14. Substantial Completion's authorized.
  - 15. Equals or Substitutions approved or rejected.

# 1.8 SHOP DRAWINGS

- A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.
- **B.** Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
  - Dimensions.
  - 2. Identification of products and materials included by sheet and detail number.
  - 3. Compliance with specified standards.
  - Notation of coordination requirements.
  - 5. Notation of dimensions established by field measurement.
  - 6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.
  - 7. Submit one (1) reproducible media and seven (7) prints as directed by the Construction Administrator. The Contractor's submittal shall identify the specification section and/or drawing number applicable to the submittal.

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- 8. Details shall be large scale and/or full size.
- **C.** The Contractor shall review the Shop Drawings, stamp with this approval, and submit them with reasonable promptness and in orderly sequence so as to cause no delay in his Work or in the Work of any subcontractor. Shop Drawings shall be properly identified as specified for item, material, workmanship, and project number. At the submission, the Contractor shall inform the Architect, in writing of any deviation in the shop drawings from the requirements of the Contract Documents.
- D. The Architect will review and comment on shop drawings with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. Refer to Article 5 of the General Conditions. Shop Drawings received by the Architect that indicate insufficient study of drawings and specifications, illegible portions or gross errors, will be rejected outright. Such rejections shall not constitute an acceptable reason for granting the Contractor additional time to perform the work.
- E. The Contractor shall make any corrections required by the Architect and shall resubmit the required number of corrected copies of Shop Drawings until fully reviewed.
- **F.** Upon final review submit four (4) additional prints, same as submitted, for use by the Construction Administrator.
- **G.** The Architect's review and comments on Shop Drawings shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents.
- **H.** Only final reviewed Shop Drawings are to be used on the Project site.
- I. The Work installed shall be reviewed in accordance with the Shop Drawings and the drawings and specifications. Final Review of the Shop Drawings by the Architect shall constitute acceptance by the State and the Architect of a variation or departure that is <u>clearly identified</u>. If the contractor believes notations made by the A/E increases the value or scope of the CD's, the contractor must provide written notice to the CA within seven (7) days of this issue. Final reviewed Shop Drawings shall not replace or be used as a vehicle to issue or incorporate change orders or substitutions. Substitutions shall be submitted in accordance with Division 01 Section 01 25 00 "Substitution Procedures".

# 1.9 Shop Drawing For Fire Protection Systems

A. Shop drawings for fire protection systems shall comply with all of the requirements in the section above "Shop Drawings". In addition Sprinkler system shop drawings and hydraulic calculations must be stamped by a professional engineer licensed in the state of Connecticut and must include the CT DCS project number. Two (2) sets of information [as noted in this Section 01 33 00 "Submittal Procedures"] shall be submitted to the State's Insurance Carrier (SIC), and one (1) set shall be submitted to the Office of the State Fire Marshal (OSFM):

# 1. CT Department of Construction Services:

Office of State Fire Marshal 1111 Country Club Road Middletown, CT 06457

For More information Contact: Terry Brouwer (860) 685-8350

#### 2. State Insurance Carrier (SIC):

FM Global Boston Operations Plan Review 500 River Ridge Drive Norwood, MA 02062

Tel: (781) 440-8241 or FAX (781) 440-8742 bostonleadengineer@fmglobal.com

- **B.** Before the shop drawings are submitted to SIC or CT DCS OSFM, the A/E's fire protection consultant must review the sprinkler design for compliance with the code, CT DCS OSFM, and FM Global requirements.
  - The State Insurance Carrier (SIC) requires two (2) weeks prior notice of a sprinkler system acceptance test.

#### 1.10 PRODUCT DATA

- **A.** Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, schedules, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
  - 1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
    - a. Manufacturer's printed recommendations.
    - b. Compliance with trade association standards.
    - c. Compliance with recognized testing agency standards.
    - d. Application of testing agency labels and seals.
    - e. Notation of dimensions verified by field measurement.
    - f. Notation of coordination requirements.
  - 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
  - Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.
  - **4. Submittals:** Submit seven (7) copies of each required submittal; submit five (5) copies where required for maintenance manuals. The Architect will retain one (1) and will return the other marked with action taken and corrections or modifications required.
    - Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
  - **5. Distribution:** Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
    - a. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
    - b. Do not permit use of unmarked copies of Product Data in connection with construction.

### 1.11 SAMPLES

- **A.** Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
  - 1. Store, mount or display Samples on site in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
    - a. Specification Section number and reference.
    - b. Generic description of the Sample.
    - c. Sample source.
    - d. Product name or name of the manufacturer.
    - e. Compliance with recognized standards.
    - f. Availability and delivery time.
  - 2. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
    - **a.** Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least three (3) multiple units that show approximate limits of the variations.
    - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.

- **c.** Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
- **d.** Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
- 3. **Preliminary Submittals:** Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices, unless otherwise noted in specification section.
  - **a.** The Architect will review and return preliminary submittals with the Architects notation, indicating selection and other action.
- **4. Submittals:** Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit three (3) sets. The Architect will return one (1) set marked with the action taken.
- 5. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
  - Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
  - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- **B. Distribution of Samples:** Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
  - 1. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
    - **a.** Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

# 1.12 QUALITY ASSURANCE SUBMITTALS

- A. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
- **B.** Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.
  - 1. **Signature:** Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
- C. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 01 Section 01 45 00 "Quality Control."

# 1.13 ARCHITECT'S ACTION

- **A.** Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
  - 1. Compliance with specified characteristics is the Contractor's responsibility.
- **B.** Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
  - 1. **Final Unrestricted Release:** When the Architect marks a submittal "Approved for fabrication," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
  - 2. Final-But-Restricted Release: When the Architect marks a submittal "Incorporate Notations," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Submit corrected copies for record. Final payment depends on that compliance.

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- 3. Returned for Resubmittal: When the Architect marks a submittal "Rejected, or Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
  - **a.** Do not use, or allow others to use, submittals marked "Rejected, or Revise and Resubmit" at the Project Site or elsewhere Work is in progress.
- **4. Other Action**: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "Action Not Required."
- C. Unsolicited Submittals: The Architect will discard unsolicited submittals without action.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 33 00

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# **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including Division 00 General Conditions of the Contract for Construction for Design-Bid-Build and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

# 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for performing alteration and renovation Work.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 00 Section 00 30 00 "General Statements for Available Information" for information that is available in addition to the Bidding Documents for review by bidders. Such information may include an existing conditions survey, contaminated soil reports, contaminated groundwater reports, hazardous building material reports, geotechnical data, etc.
  - 2. Division 01 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating cutting and patching with other construction activities.
  - 3. Division 01 Section 01 73 29 "Cutting and Patching" for procedures for cutting and patching.
  - 4. Division 01 Section 01 74 19 "Construction Waste Management & Disposal" for the requirements for waste management goals, waste management plan and waste management plan implementation.
  - 5. Division 02 Section 02 41 00 "Selective Site Demolition" for demolition of selected portions of the site.
  - Division 02 Section 02 41 19 "Selective Demolition and Alteration Work" for demolition of selected portions of the building for alterations.
  - 7. Division 50 00 00 "Project-Specific Available Information" for information that is referenced in Section 00 30 00 "General Statements for Available Information".
  - 8. Refer to other Sections for specific requirements and limitations applicable to performing alteration Work with individual parts of the Work.
  - Requirements of this Section apply to mechanical and electrical installations. Refer to Division 21, 22, 23 and 26 Sections for other requirements and limitations applicable to renovation Work by mechanical and electrical installations.

# C. Definitions:

- Clean Fill: Either (1) natural soil or (2) rock, brick, ceramics, concrete, and asphalt paving fragments which are virtually inert and pose neither a pollution threat to ground or surface waters nor a fire hazard.
- Contaminated Soil: Treated or untreated soil and/or sediment affected by a known or suspected release and determined, or reasonably expected to contain substances exceeding Residential Direct Exposure Criteria or GA Pollutant Mobility Criteria, as these terms are defined in the Remediation Standard Regulations (RCSA Section 22a-133k-1).
- Hazardous Soil: Soil that is classified as a hazardous waste. Soil is classified as hazardous
  waste if it exhibits a hazardous waste characteristic or if it contains RCRA-listed hazardous
  constituents above Connecticut's RCRA "Contained-In" Policy dated May 2002.
- 4. Natural Soil: Soil in which all substances naturally occurring therein are present in concentrations not exceeding the concentrations of such substance occurring naturally in the environment and in which soil no other substance is analytically detectable.
- 5. Polluted Soil: Soil affected by a release of a substance at a concentration above the analytical detection limit for such substance in accordance with RCSA 22a-133k-1(a)(45) or for naturally occurring substance at a concentration that exceeds concentrations that naturally occur in the environment.
- 6. Regulated Soil: Includes Polluted Soil, Contaminated Soil, and Hazardous Soil.

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7. Groundwater Remediation Wastewater: Wastewater generated in connection with investigating pollution or remediating polluted groundwater or soil. Groundwater remediation wastewater includes without limitation groundwater withdrawn from a groundwater recovery well; groundwater which collects in an excavation or foundation drain or other subsurface facility or structure; groundwater contaminated runoff and stormwater impacted by on-site pollutants from any construction activity; condensate resulting from construction or maintenance of a soil vapor extraction system; and wastewater generated by developing, testing, sampling, or purging a well.

# **PART 2 - PRODUCTS**

# 2.1 PRODUCTS FOR PATCHING AND EXTENDING WORK

- A. New materials: As specified in product sections; match existing Products and Work for patching and extending Work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

# 2.2 SALVAGEABLE MATERIALS

- **A.** The **Contractor** shall be responsible for removing the following salvageable items from premises and transporting said items to **Norwalk Community College**, CT.
  - 1. Fixtures: All exterior light poles
- **B.** The Contractor shall notify the Construction Administrator in writing seven (7) days prior to removing all salvageable items from the existing alteration project location and unloading all salvageable items at Norwalk Community College, Norwalk, Connecticut and store items in the appropriate location as directed by Campus personnel.

# **PART 3 - EXECUTION**

# 3.1 INSPECTION

# A. General:

- 1. Observe all existing conditions prior to submitting a bid. Include in the bid, existing conditions and their impact, particularly to cost and health and safety of workers and occupants, and proper function and operation of the facility. Be aware of other work being performed. Failure to visit the site shall in no way provide relief from the necessity of furnishing materials or performing any work that may be required to complete the work in accordance with the Contract Documents without additional cost to the Owner. All site visits shall be scheduled with the Owner.
- 2. The quantities, locations and the extent of work indicated are best estimates, which are limited by the physical constraints imposed by occupancy of the facility. Consider all aspects of the substrates within the identified plan area. Material information and quantities were obtained from site surveys. Accordingly, variations (plus or minus 10 percent) in quantities within the limits of the work area are considered as having no impact on contract sum and contract performance period. Where additional abatement work is required beyond the above variations, the contract sum and contract performance period shall be adjusted under provisions of Division 01 of the Specifications.
- **3.** Verify that demolition is complete and areas are ready for installation of new Work.
- 4. Beginning of restoration Work means acceptance of existing conditions.

# B. Project Procedures for Work Involving Asbestos Containing Material (ACM):

- The Contractor is responsible for abating all Asbestos Containing Material (ACM) that is visible and accessible.
- 2. In demolition projects, every attempt should be made by the Contractor to remove all ACM.
- 3. Testing for asbestos has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair, the results of the asbestos testing are summarized in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent

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- of asbestos. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.
- 4. If the Contractor should encounter any material suspected or known to contain asbestos not previously identified and assigned as the Contractor's responsibility, then the Contractor should immediately notify the Construction Administrator in writing of same. It is the Owner's responsibility to have the material tested and abated (if necessary). The Owner will respond within twenty four (24) hours after receiving the Contractor's written request to the Construction Administrator for testing the suspect material. If necessary, the Contractor will abate ACM within a reasonable time period after the Owner's issuance of a Change Order for the additional abatement work.
  - 4.1 When the Owner requests the Contractor undertake the responsibilities for the abatement and disposal of the ACM, then the compensation to the Contractor by Owner for the Work shall be determined by the "Unit Prices" stated in Section 01 20 00 Contract Considerations.
- No attempt has been made to locate hazardous material associated with existing site utilities, though it is presumed that at least some asbestos may be discovered associated with underground piping during the course of site and site utilities work. If and when such materials appear, the Contractor shall notify the Owner, who shall direct additional work outside of this Agreement to assist in cutting up and disposing of same. The Contractor shall assist the hazardous materials contractor(s) with excavating, heavy lifting, and the like at no additional cost to the Owner.

#### C. Project Procedures for Work Involving Lead-Based Paint (LBP):

- The Contractor is responsible for abating all Lead-Based Paint (LBP) prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.
- The Contractor shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations as specified in this Section 01 35 16 Alteration Project Procedures and as specified in Section 02 83 19 Lead Paint Awareness.
- If testing for LBP has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair, then the results of the LBP testing are summarized in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of LBP. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.
- If the Contractor should encounter any material suspected or known to contain LBP that was not previously identified and assigned as the Contractor's responsibility, then the Contractor should immediately notify the Construction Administrator in writing of same. It is the State's responsibility to have the material tested and abated (if necessary). The Owner will respond within four (4) Calendar Days after receiving the Contractor's written request to the Construction Administrator for testing the suspect material. If necessary, the Contractor will abate LBP within a reasonable time period after the Owner's issuance of a Change Order for the additional abatement work.
  - 4.1 When the Owner requests the Contractor undertake the responsibilities for the abatement and disposal of the LBP, then the compensation to the Contractor by Owner for the Work shall be determined by the "Unit Prices" stated in Section 01 20 00 Contract Considerations.
- Exposure levels for lead in the construction industry are regulated by 29 CFR 1926.62. Construction activities disturbing surfaces containing lead-based paint (LBP) which are likely to be employed, such as sanding, grinding, welding, cutting and burning, have been known to expose workers to levels of lead in excess of the Permissible Exposure Limit (PEL). Conduct demolition and removal Work specified in the technical sections of this specification in conformance with these regulations. In addition, construction debris/waste may be classified as hazardous waste. Disposal of hazardous waste material shall be in accordance with 40 CFR Parts 260 through 271 and Connecticut Hazardous Waste Management Regulations Section 22a-209-1; 22a-209-8(c); 22a-449(c)-11; and 22a-449(c)-100 through 110.
- The Contractor's Work shall be based on a child under the age of six (6) years in residence; the Work shall also be in accordance with Connecticut Regulations Section 19a-111-1 through 11.
- This facility was constructed prior to 1978 it is likely to have painted surfaces containing leadbased paint.

CT DAS 5200 (Rev. 02.01.18) PROJECT NO.: BI-CTC-467 8. In accordance with the United States Environmental Protection Agency's (EPA) Lead-Based Paint Renovation, Repair, and Painting Program (RRP) issued by the EPA on April 22, 2008, as amended, and regulated by 40 CFR 745, contractors performing renovation, repair and painting projects that disturb lead-based paint in homes, child care facilities, and schools built before 1978 must be certified and must follow specific work practices to prevent lead contamination. EPA requires that firms performing renovation, repair, and painting projects that disturb lead-based paint in pre-1978 homes, child care facilities and schools be certified by EPA and that they use certified renovators who are trained by EPAapproved training providers to follow lead-safe work practices. The Contractor must be a Renovation Firm that has completed an EPA Lead-Safe Certification Program and be certified to conduct lead-based paint activities and renovations under the RRP rule. The Contractor shall have at least one "Certified Renovator" assigned to jobs where LBP is disturbed.

### D. Project Procedures for Work Involving Polychlorinated Biphenyls (PCBs) in Building Materials:

- 1. This facility was constructed between 1950 and 1978, it is likely to have caulk and/or glazing containing PCBs.
- The Contractor is responsible for abating all Polychlorinated Biphenyls (PCBs) in Building Materials prior to the start of any Work involving construction, renovation or demolition (if necessary). unless noted differently below or specified differently elsewhere.
- The Contractor shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations as specified in Section 01 35 16 Alteration Project Procedures and as specified in Section 02 21 00 Earthwork, 02 84 16 Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury.
- If the Owner has tested the facility scheduled for renovation, demolition, reconstruction alteration, remodeling or repair for PCBs in Building Materials such as caulk and glazing or other types of material, then the results are located in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections; otherwise the Owner assumes such materials do not warrant testing. It is the Owner's responsibility to have the material tested, not the Contractor, subcontractors or anyone working on behalf of the Contractor.
- 5. In the case where the Owner has a survey of locations with results and if the Contractor should encounter new areas of the subject material already identified by the survey, then he should immediately notify the Construction Administrator in writing of same. It is the State's responsibility to have the material tested and abated (if necessary). The Owner will respond within four (4) Calendar Days after receiving the Contractor's written request to the Construction Administrator for testing the suspect material. If necessary, the Contractor will abate PCBs in Building Materials within a reasonable time period after the Owner's issuance of a Change Order for the additional abatement work.
  - When the Owner requests the Contractor undertake the responsibilities for the abatement and disposal of the PCBs in Building Materials, then the compensation to the Contractor by Owner for the Work shall be determined by the "Unit Prices" stated in Section 01 20 00 **Contract Considerations.**
- 6. The work shall be performed by persons who are knowledgeable, qualified, and trained in the removal, treatment, handling, and disposal of PCB contaminated wastes and the subsequent cleaning of the affected environment. These Specifications govern all work activities that disturb PCB-containing caulk and glazing and associated building material. All activities shall be performed in accordance with, but not limited to, OSHA Regulation 29 CFR 1926, the United States Environmental Protection Agency's PCB Regulation 40 CFR Part 761, Connecticut General Statutes 22a-463 through -469 inclusive.
- E. Project Procedures for Work Involving Hazardous Materials, Wastes, and Items and Universal Wastes (Including Products Containing Persistent Bioaccumulative Toxic Chemicals" (PBTs) such as Polychlorinated Biphenols (PCBs), Di-2-ethylhexyl Phthalate (DEHP), and Mercury):
  - The Contractor is responsible for abating all Hazardous Materials, Wastes, and Items and Universal Wastes including products containing Persistent Bioaccumulative Toxic Chemicals" (PBTs) such as Polychlorinated Biphenols (PCBs), Di-2-ethylhexyl Phthalate (DEHP), and Mercury prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.

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- 2. If a Hazardous Materials, Wastes, and Items and Universal Wastes Inventory has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair, then the results of the inventory are summarized in Division 50 00 00 Project-Specific Available Information, Section 50 30 00 Hazardous Building Materials Inspection and Inventory at the end of the Technical Specification Sections. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of Hazardous Materials, Wastes, and Items and Universal Wastes. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work
- 3. If the Contractor should encounter any Hazardous Materials, Wastes, and Items and Universal Wastes that were not previously identified and assigned as the Contractor's responsibility, then the Contractor should immediately notify the Construction Administrator in writing of same. It is the State's responsibility to have the material tested and abated (if necessary). The Owner will respond within four (4) Calendar Days after receiving the Contractor's written request to the Construction Administrator for testing the suspect material. If necessary, the Contractor will abate Hazardous Materials, Wastes, and Items and Universal Wastes within a reasonable time period after the Owner's issuance of a Change Order for the additional abatement work.
- 4. Exposure Levels for PBTs such as PCBs, DEHP, and mercury in the construction industry are regulated by 29 CFR 1910.1200 and 29 CFR 1926.28 et. al. Demolition and removal work may expose workers in excess of the respective Permissible Exposure Limit (PEL). Conduct demolition and removal work specified in the technical sections of these specifications in conformance with these regulations.
- 5. Examples of Hazardous Materials, Wastes, and Items and Universal Wastes include, but are not limited to, fluorescent light fixtures and exit signs, ballasts, high-intensity discharge (HID) lamps, certain types of construction products containing vinyl, mercury containing electrical switches, gauges, and thermostats; PCB Capacitors, refrigerants, pressurized cylinders, smoke/carbon dioxide detectors, used electronics, batteries, transformer/hydraulic fluids/oils, and miscellaneous household hazardous waste.
- 6. For the purposes of this paragraph, PCB's in building material such as caulk and glazing or any other type of material not listed above is not applicable to this paragraph.
- Construction debris/waste may be classified as hazardous waste. Disposal of all hazardous materials shall be in accordance with but not limited to applicable provisions of 40 CFR Parts 761 Subpart K, 761, and 761.65 and the Connecticut General Hazardous Waste Statute Sec. 22a-454.

# F. Project Procedures for Work Involving Regulated Soils:

- 1. The **Contractor** is responsible for the excavation, staging, loading, transportation, and disposal of all Regulated Soils prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.
- 2. The Contractor shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations and as specified in Section 01 35 16 Alteration Project Procedures and Section 01 20 00 Contract Considerations, Section 01 50 00 Temporary Facilities and Controls, Section 02 21 00 Earthwork, Section 02 41 00 Selective Site Demolition, Section 02 41 19 Selective Demolition and Alteration Work, Section 31 11 00 Clearing and Grubbing, Section 31 23 33 Trenching and Backfilling, Section 50 00 00 Project-Specific Additional Information.
- 3. If the Contractor should encounter any Regulated Soil that was not previously identified and assigned as the Contractor's responsibility, he should immediately notify the Construction Administrator in writing of same. It is the State's responsibility to have the soil tested and remediated (if necessary). The Owner will respond within four (4) Calendar Days after receiving the Contractor's written request to the Construction Administrator for testing the suspect soil. If necessary, the Contractor will remediate and dispose of the additional Regulated Soil within a reasonable time period after the Owner's issuance of a Change Order for the additional remediation and disposal work.
  - When the Owner requests the Contractor undertake the responsibilities for the remediation and disposal of all Regulated Soils, then the compensation to the Contractor by Owner for the Work shall be determined by the "Unit Prices" stated in Section 01 20 00 Contract Considerations.
- 4. Disposal of all hazardous materials shall be in accordance with but not limited to applicable provisions of 40 CFR Parts 761 Subpart K, 761, and 761.65 and the Connecticut General Hazardous Waste Statute Sec. 22a-454.

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### H. Project Procedures for Work Involving Contaminated Groundwater:

- 1. The **Contractor** is responsible for the permitting and disposal of Contaminated Groundwater prior to the start of any Work involving renovation, demolition, reconstruction, alteration, remodeling, or repair (if necessary), unless noted differently below or specified differently elsewhere.
- 2. The Contractor shall conduct all demolition and removal Work, specified in the Technical Specifications Sections of this Project Manual, in conformance with the regulations and as specified in Section 01 35 16 Alteration Project Procedures and Section 01 50 00 Temporary Facilities and Controls, Section 02 21 00 Earthwork, Section 02 41 00 Selective Site Demolition, Section 02 41 19 Selective Demolition and Alteration Work, Section 31 11 00 Clearing and Grubbing, Section 31 23 33 Trenching and Backfilling, and Section 50 00 00 Project-Specific Additional Information.
- 3. If the Contractor should encounter any Contaminated Groundwater that was not previously identified, characterized, permitted, and assigned as the Contractor's responsibility, he should immediately notify the Construction Administrator in writing of same. It is the State's responsibility to have the groundwater tested and abated (if necessary). The Owner will respond within four (4) Calendar Days after receiving the Contractor's written request to the Construction Administrator for testing the suspect groundwater. If necessary, the Contractor shall arrange for the permitting and disposal of the Contaminated Groundwater within a reasonable time period after the Owner's issuance of a Change Order for the additional remediation work.
- I. See also General Conditions Article 23 "Cutting, Fitting, Patching and Digging".

#### 3.2 PREPARATION

- **A.** Cut, move, or remove items as are necessary for access to alteration and renovation Work. Replace and restore at completion.
- **B.** Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- **C.** Remove debris and abandoned items from area and from concealed spaces.
- D. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.
- **E.** Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

# 3.3 INSTALLATION

- A. Coordinate alteration and renovation Work to expedite completion, and if required sequence Work to accommodate Owner occupancy.
- **B.** Remove, cut and patch Work in a manner to minimize damage and to provide restoring products and finishes to original and or specified condition in accordance with **Section 01 73 29 "Cutting and Patching"**.
- C. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes in accordance with Section 01 73 29 "Cutting and Patching".
- D. In addition to specified replacement of equipment and fixtures, restore existing plumbing, heating, ventilation, air conditioning, and electrical systems to full operational condition.
- E. Recover and refinish Work that exposes mechanical and electrical Work exposed accidentally during the Work.
- F. Install products as specified in individual specification sections.

# 3.4 TRANSITIONS

- **A.** Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch work to match existing adjacent Work in texture and appearance.
- **B.** When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect/Engineer.

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### 3.5 ADJUSTMENTS

- **A.** Where removal of partitions or walls result in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
- **B.** Where a change of plane of <u>1/4-inch</u> in <u>(12) inches</u> or more occurs, request recommendation from Architect/Engineer for providing a smooth transition.
- C. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- D. Fit Work at penetrations of surfaces as specified in Section 01 73 29 "Cutting and Patching".

# 3.6 REPAIR OF DAMAGED SURFACES

- A. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing imperfections.
- B. Repair substrate prior to patching finishes.

# 3.7 FINISHES

- A. Finish surfaces as specified in individual product specification sections.
- **B.** Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

### 3.8 CLEANING

A. In addition to cleaning specified in Section 01 50 00 "Temporary Facilities and Controls", clean Agency occupied areas of Work.

END OF SECTION 01 35 16

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# PART 1 GENERAL

# 1.1 RELATED DOCUMENTS

A. Construction Documents and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section

#### 1.2 SUMMARY

- A. This guide specification covers construction safety requirements and requirements for the protection of people, property, and resources. It is intended for use in construction, renovation, and demolition projects for the State of Connecticut Department of Administrative Services (DAS) / Construction Services (CS).
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 33 00 Submittal Procedures specifies the requirements for submittal requirements;
  - 2. Division 01 Section 01 31 19 "Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.

### 1.2 REFERENCES

**A.** The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

	DF SAFETY ENGINEERS (ASSE/SAFE)
www.asse.org/publicat	
ASSE/SAFE A10.32	(2004) Fall Protection
ASSE/SAFE A10.34	(2001; R 2005) Protection of the Public on or Adjacent to Construction
	Sites
ASSE/SAFE Z359.1	(2007) Safety Requirements for Personal Fall Arrest Systems,
	Subsystems and Components
AMERICAN SOCIETY O	OF MECHANICAL ENGINEERS (ASME) <u>www.asme.org/Codes/</u>
ASME B30.22	(2005) Articulating Boom Cranes
ASME B30.3	(2004) Construction Tower Cranes
ASME B30.5	(2004) Mobile and Locomotive Cranes
ASME B30.8	(2004) Floating Cranes and Floating Derricks
NATIONAL FIRE PROT	ECTION ASSOCIATION (NFPA)
www.nfpa.org/	
NFPA 10	(2007) Portable Fire Extinguishers
NFPA 51B	(2009) Standard for Fire Prevention During Welding, Cutting, and Other
	Hot Work
NFPA 241	(2004) Safeguarding Construction, Alteration, and Demolition Operations
NFPA 70	(2008) National Electrical Code
NFPA 70E	Standard for Electrical Safety in the Workplace
CODE OF FEDERAL RI	EGULATIONS (CFR)
www.archives.gov/fede	<u>eral-register/cfr/</u>
10 CFR	Standards for Protection Against Radiation
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1910.28	Safety Requirements For Scaffolding.
29 CFR 1910.146	Permit-required Confined Spaces
29 CFR 1910.147	Control Of Hazardous Energy (Lockout/Tagout)
29 CFR 1910.178	Powered industrial trucks.
29 CFR 1915	Confined and Enclosed Spaces and Other
29 CFR 1926	Safety and Health Regulations for Construction
29 CFR 1926.500	Fall Protection
29 CFR 1926.550	Cranes and Derricks

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US Army Core of Engineers (USACE) www.iwr.usace.army.mil	
EM 385-1-1	Safety, and Health Requirements Manual (2008),

# 1.3 SUBMITTALS

- **A.** An "O" followed by "A" indicates that the Owner acceptance; submittals not having an "O" designation are for Contractor Quality Control approval.
- B. Submittal Procedures:
  - 1. Preconstruction Submittals:
    - a. Accident Prevention Plan (APP): "O, A":
    - **b.** Activity Hazard Analysis (AHA); "O, A";
    - c. Crane Critical Lift Plan; "O, A";
    - d. Proof of qualification for Crane Operators; O, A.
  - Test Reports: Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."
    - a. Accident Reports;
    - b. Monthly Exposure Reports;
    - c. Crane Reports;
    - d. Regulatory Citations and Violations;
    - e. Gas Protection.
  - 3. Certificates:
    - a. Confined Space Entry Permit;
    - **b.** Hot work permit:
    - c. License Certificates.
    - d. Certificate of Compliance Crane

### 1.4 DEFINITIONS

- **A. Competent Person.** A competent person is one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- **B.** Competent Person for Fall Protection. A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as their application and use with related equipment, and has the authority to take prompt corrective measures to eliminate the hazards of falling.
- Confined Space: A space which by design has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy. Confined spaces include, but are not limited to storage tanks, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.
- D. High Visibility Accident: Any mishap which may generate publicity and/or high visibility.
- **E. Medical Treatment**; Medical treatment includes treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.
- **F. Operating Envelope:** The area surrounding any crane. Inside this "envelope" is the crane, the operator, riggers and crane walkers, rigging gear between the hook and the load, the load and the crane's supporting structure (ground, rail, etc.).
- **G. Qualified Person for Fall Protection:** A person with a recognized degree or professional certificate and with extensive knowledge, training and experience in the field of fall protection; who is capable of performing design, analysis, and evaluation of fall protection systems and equipment.
- H. Recordable Injuries or Illnesses: Any work-related injury or illness that results in:
  - Death, regardless of the time between the injury and death, or the length of the illness;

- 2. Days away from work (any time lost after day of injury/illness onset);
- Restricted work: 3.
- 4. Transfer to another job:
- 5. Medical treatment beyond first aid;
- 6. Loss of consciousness; or
- A significant injury or illness diagnosed by a physician or other licensed health care professional, even 7. if it did not result in (1) through (6) above.
- I. Weight Handling Equipment (WHE) Accident: A WHE accident occurs when any one or more of the six elements in the operating envelope fails to perform correctly during operation, including operation during maintenance or testing resulting in personnel injury or death; material or equipment damage; dropped load; derailment; two-blocking; overload; and/or collision, including unplanned contact between the load, crane, and/or other objects. A dropped load, derailment, two-blocking, overload and collision are considered an accident even though no material damage or injury occurs. A component failure (e.g., motor burnout, gear tooth failure, bearing failure) is not considered an accident solely due to material or equipment damage unless the component failure results in damage to other components (e.g., dropped boom, dropped load, roll over, etc.).]

#### 1.5 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this Section see, Division 01, Section 01 42 20 "Reference Standards and Definitions" for other state laws, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, regulations, and referenced documents vary, the most stringent requirements govern.

#### SITE QUALIFICATIONS, DUTIES, AND MEETINGS 1.6

- **Personnel Qualifications:** Α.
- В. Site Safety and Health Officer (SSHO):
  - Provide a Site Safety and Health Officer (SSHO) at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The Contractor Quality Control (QC) person cannot be the SSHO on this project, even though the QC has safety inspection responsibilities as part of the QC duties. Meet the following requirements within the SSHO:
    - Level 5: An Associate Safety Professional (ASP), Certified Safety Trained Supervisor (STS) and/or Construction Health & Safety Technician (CHST). A minimum of 10 years safety work of a progressive nature with at least 5 years of experience on similar projects. 30-hour OSHA construction safety class or equivalent within the last five (5) years. An average of at least 24 hours of formal safety training each year for the past five (5) years with training for competent person status for at least the following areas of competency: Excavation: Scaffolding: Fall protection: Hazardous energy: Confined space: Health hazard recognition, evaluation and control of chemical, physical and biological agents: Personal protective equipment and clothing to include selection, use and maintenance.
- Associate Safety professional (ASP), Certified Safety Trained Supervisor (STS) and/or C. Construction Health and Safety Technician (CHST): Provide an Associate Safety Professional (ASP), Certified Safety Trained Supervisor (STS) and/or Construction Health & Safety Technician (CHST) at the work site to perform safety management, surveillance, inspections, and safety enforcement for the Contractor. The ASP,STS and/or CHST shall be the safety and occupational health "competent person" as defined by this section. The ASP, STS and/or CHST shall be at the work site at all times whenever work or testing is being performed and shall conduct and document daily safety inspections. The ASP, STS and/or CHST shall have no other duties other than safety and occupational health management, inspections, and enforcement on this contract.

#### D. **Crane Operators:**

Meet the Crane Operators and Crane Operation requirements of the Connecticut Bureau of License and Permits - Cranes, Department of Administrative Services, Office of State Fire Marshal pursuant to C.G.S § 29-221 through 29-230. Provide proof of current license and qualification. For more information visit the DAS website (www.ct.gov/DAS) > Licensing, Certification, Permitting and Codes > Cranes, or call (860) 713-5580 or (860) 713-5529.

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#### E. Personnel Duties:

# 1. Site Safety and Health Officer (SSHO):

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily quality control report.
- b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors. For more information visit the OSHA website at www.osha.gov > Employers > Recordkeeping Requirements and Forms.
- c. Maintain applicable safety reference material on the job site.
- **d.** Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- e. Implement and enforce accepted APPS and AHAs.
- f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. Post a list of unresolved safety and health deficiencies on the safety bulletin board.
- **g.** Ensure sub-contractor compliance with safety and health requirements.

Failure to perform the above duties will result in dismissal of the superintendent and/or SSHO, and a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

# 2. Associate Safety Professional (ASP), Certified Safety Trained Supervisor (STS) and/or Certified Construction Health & Safety Technician (CHST):

- Perform safety and occupational health management, surveillance, inspections, and safety enforcement for the project.
- **b.** Perform as the safety and occupational health "competent person" as defined by this section.
- **c.** Be on-site **at all times.** whenever work or testing is being performed.
- d. Conduct and document safety inspections.
- e. Shall have no other duties other than safety and occupational health management, inspections, and enforcement on this contract.

If the **ASP**, **STS CHST** is appointed as the SSHO all duties of that position shall also be performed.

# F. Meetings:

# 1. Preconstruction Conference:

- a. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the preconstruction conference. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the **Accident Prevention Plan** (APP); (including the **Activity Hazard Analyses** (AHAs), and special plans, program and procedures associated with it).
- b. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Owner's Representative(s) as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.
- c. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the preconstruction conference, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

# 2. Safety Meetings:

Safety meetings shall be conducted to review past activities, plan for new or changed operations, review pertinent aspects of appropriate AHA (by trade), establish safe working procedures for anticipated hazards, and provide pertinent safety and health training and motivation.

- **a.** Meetings shall be conducted at least once a month for all supervisors on the project location and at least once a week for all workers by supervisors or foremen.
- b. Meetings shall be documented, including the date, persons in attendance, subjects discussed, and names of individual(s) who conducted the meeting. Documentation shall be maintained and copies furnished to the Construction Administrator (CA) on request.

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c. The Construction Administrator (CA) shall be informed of all scheduled meetings in advance and be invited to attend.

# 1.7 ACCIDENT PREVENTION PLAN (APP):

- **A.** Use a qualified person to prepare the written site-specific APP.
  - Prepare the APP in accordance with the format and requirements of US Army Core of Engineers (USACE), Safety, and Health Requirements Manual, EM 385-1-1, or as approved by the CA and as supplemented herein. Cover all paragraphs and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Accident Prevention Plan" or as approved by the CA. The USACE Safety, and Health Requirements Manual, EM 385-1-1 is available at the USACE Website www.iwr.usace.army.mil.
  - 2. Specific requirements for some of the APP elements are described in "B" below. The APP shall be job-specific and address any unusual or unique aspects of the project or activity for which it is written.
- B. The APP shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and made site-specific. The Owner considers the Prime General Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated Certified Safety Professional (CSP) and/or Certified Industrial Hygienist (CIH).
- C. Submit the APP to the DAS/CS Project Manager and Construction Administrator Fourteen (14) Calendar Days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once accepted by the DAS/CS Project Manager and Construction Administrator, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the DAS/CS Project Manager and Construction Administrator, until the matter has been rectified. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the DAS/CS Project Manager and Construction Administrator, project superintendent, Site Safety and Health Officer (SSHO) and quality control manager. Should any hazard become evident, stop work in the area, secure the area, and develop a plan to remove the hazard. Notify the DAS/CS Project Manager and Construction Administrator within Twenty Four (24) hours of discovery. Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by American Society of Safety Engineers, ASSE/SAFE A10.34 Protection of the Public on or Adjacent to Construction Sites, see <a href="https://www.asse.org">www.asse.org</a>) and the environment.

Copies of the accepted plan will be maintained at the Construction Administrator's office at the job site. Continuously reviewed and amended the APP, as necessary, throughout the life of the contract. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered.

### D. APP Contents:

The contents of the Accident Prevention Plan (APP) shall be in accordance with **Appendix A** of the US Army Corps of Engineers, **EM 385-1-1 Safety and Health Requirements Manual**, Appendix A, Minimum Basic Outline for Accident Prevention Plans or as approved by the CA. For more information visit the USACE Website at **www.usace.army.mil/Library**.

- 1.8 ACTIVITY HAZARD ANALYSIS (AHA): Activity Hazard Analyses (AHAs) define the activities being performed and identify the sequences of work, the specific hazards anticipated, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk. The Activity Hazard Analysis (AHA) format shall be in accordance with US Army Corps of Engineers, EM 385-1-1 Safety and Health Requirements Manual or as approved by the CA.
  - A. Submittals:
    - Submit initial AHA to CA for review at least Fifteen (15) Calendar Days prior to the start of each phase. Format subsequent AHAs as amendments to the APP. The analysis should be used during

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- daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.
- 2. The AHA list will be reviewed monthly at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. Any activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the CA.

# 1.9 DISPLAY OF SAFETY INFORMATION

Within [1] One Calendar Days after commencement of work, erect a safety bulletin board at the job site. Include and maintain information on safety bulletin board as required by US Army Corps of Engineers, EM 385-1-1 Safety and Health Requirements Manual, Section 01.A.06 or as approved by the CA. Additional items required to be posted include:

- A. Confined space entry permit.
- **B.** Hot work permit.

#### 1.10 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

# 1.11 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. The Owner has no responsibility to provide emergency medical treatment.

### 1.12 REPORTS

### A. Accident Reports

1. Conduct an accident investigation for recordable injuries and illnesses, and property damage accidents resulting in at least <a href="Two Thousand">Two Thousand</a> Dollars (\$2,000) in damages, to establish the root cause(s) of the accident, complete "Accident Report Form" approved by the CA. Provide the report to the CA within [5] Five Calendar Days of the accident.

# B. Accident Notification

Notify the CA as soon as practical, but not later than [4] Four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than \$2,000, or any weight handling equipment accident.

- 1. Within notification include the following:
  - a. contractor name:
  - b. contract title;
  - c. type of contract;
  - d. name of activity.
  - e. installation or location where accident occurred;
  - f. date and time of accident:
  - g. names of personnel injured;
  - h. extent of property damage, if any; extent of injury, if known, and brief description of accident to include type of construction equipment used, Personal Protective Equipment (PPE) used, etc.. Preserve the conditions and evidence on the accident site until the U.S. Department of Labor, Occupational Safety and Health Administration (USDOL-OSHA) investigation team arrives on-site and USDOL-OSHA investigation is conducted.

# C. Monthly Exposure Reports

Monthly exposure reporting to the CA is required to be attached to the monthly Application for Payment request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. Provide on a form approved by the CA.

# D. Crane Reports

Submit crane inspection reports on a form approved by the CA and as specified herein with Daily Reports of Inspections.

E. HOT WORK

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Hot Work shall only be performed in accordance with the requirements of NFPA 51B "Fire Prevention During Welding, Cutting and Other Hot Work Standard.

### 1. Definitions:

- a. Hot Work: Work involving burning, welding, or a similar operation that is capable of initiating fires or explosions. Examples listed by NFPA include arc welding, oxygen- fuel gas welding, open-flame soldering, brazing, thermal spraying, oxygen cutting, and arc cutting.
- b. Permit Authorizing Individual (PAI). Means the individual designated by the General Contractor to authorize hot work. The PAI is permitted to be, among others, the General Contractor's project executive, supervisor, foreperson, or designated safety administrator. The PAI CANNOT be the hot work operator, except as permitted in NFPA 51B. The PAI is aware of the fire hazards involved and is familiar with the provisions of this standard.
- 2. Permit: Submit and obtain a written permit from the PAI prior to performing "Hot Work" (welding, cutting, etc.) or operating other flame-producing/spark producing devices, from the PAI. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. The General Contractor will provide at least two (2) twenty (20) pound 4A:20 BC rated extinguishers for normal "Hot Work". All extinguishers shall be current inspection tagged, approved safety pin and tamper resistant seal.
- 3. Fire Watch: It is also mandatory to have a designated FIRE WATCH for any "Hot Work" done at this activity. The Fire Watch shall be trained in accordance with NFPA 51B Standard for Fire Prevention During Welding, Cutting, and Other Hot Work and remain on-site for a minimum of 30 minutes after completion of the task or as specified on the hot work permit. When starting work in the facility, require personnel to familiarize themselves with the location of the nearest fire alarm boxes and place in memory the local fire department emergency phone number(s). ANY FIRE, NO MATTER HOW SMALL, SHAL BE REPORTED TO THE LOCAL FIRE DEPARTMENT, GENERAL CONTRACTOR'S AUTHORIZED REPRESENTATIVE, AND OWNER'S CA IMMEDIATELY.

# 1.13 FACILITY OCCUPANCY CLOSURE

Streets, walks, and other facilities occupied and used by the state User Agency shall not be closed or obstructed without written permission from the CA.

# 1.18 SEVERE STORM PLAN

In the event of a severe storm warning, the Contractor must:

- **A.** Secure outside equipment and materials and place materials that could be damaged in protected areas.
- **B.** Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
- **C.** Ensure that temporary erosion controls are adequate.

#### PART 2 PRODUCTS

NOT USED.

### PART 3 EXECUTION

# 3.1 CONSTRUCTION AND/OR OTHER WORK

Comply with the Connecticut State Building and Fire Safety Codes, OSHA regulations, and other references regulations. The most stringent standard prevails.

# 3.1.2 HAZARDOUS MATERIAL EXCLUSIONS

Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation (with the exception of radioactive material and devices used in accordance with **USACE EM 385-1-1** such as nuclear density meters for compaction testing and laboratory equipment with radioactive sources) as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocynates, lead-based paint are prohibited. The CA, upon written request by the Contractor, may consider exceptions to the use of any of the above excluded materials.

# 3.1.3 UNFORESEEN HAZARDOUS MATERIAL

A. Related Section: Division 01, Section 01 35 16, Alteration Project Procedures.

#### 3.2 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least [15] Fifteen Calendar Days in advance. As a minimum, the request should include the location of the outage, utilities being affected, duration of outage and any necessary sketches. Special requirements for electrical outage requests are contained elsewhere in this specification section. Once approved, and prior to beginning work on the utility system requiring shut down, attend a pre-outage coordination meeting with the CA, User Agency Representative, and Public Utilities representative to review the scope of work and the lock-out/tag-out procedures for worker protection. No work will be performed on energized electrical circuits unless proof is provided that no other means exist.

#### SAFETY LOCKOUT/TAGOUT PROCEDURES 3.3

- The General Contractor shall ensure that each employee is familiar with and complies with these procedures and OSHA 29 CFR 1910.147 Control Of Hazardous Energy (Lockout/Tagout).
  - The General Contractor's "Authorized Employee" shall apply lockout/tagout tags and take other actions that, because of experience and knowledge, are known to be necessary to make the particular equipment safe to work on.
  - 2. No person, regardless of position or authority, shall operate any switch, valve, or equipment that has an official lockout/tagout tag attached to it, nor shall such tag be removed except as provided in this
  - No person shall work on any equipment that requires a lockout/tagout tag unless he, his immediate 3. supervisor, project leader, or a subordinate has in his possession the stubs of the required lockout/tagout tags. Only qualified personnel shall perform work on electrical circuits.
  - A supervisor who is required to enter an area protected by a lockout/tagout tag will be considered a member of the protected group provided he notifies the holder of the tag stub each time he enters and departs from the protected area.
  - Identification markings on building light and power distribution circuits shall not be relied on for 5. established safe work conditions.
  - Before clearance will be given on any equipment other than electrical (generally referred to as mechanical apparatus), the apparatus, valves, or systems shall be secured in a passive condition with the appropriate vents, pins, and locks. Pressurized or vacuum systems shall be vented to relieve differential pressure completely. Vent valves shall be tagged open during the course of the work. Where dangerous gas or fluid systems are involved, or in areas where the environment may be oxygen deficient, system or areas shall be purged, ventilated, or otherwise made safe prior to entry.

#### B. **Tag Placement**

Lockout/tagout tags shall be completed in accordance with the regulations printed on the back thereof and attached to any device which, if operated, could cause an unsafe condition to exist. If more than one group is to work on any circuit or equipment, the employee in charge of each group shall have a separate set of lockout/tagout tags completed and properly attached. When it is required that certain equipment be tagged, the State of Connecticut Authority Having Jurisdiction will review the characteristics of the various systems involved that affect the safety of the operations and the work to be done; take the necessary actions, including voltage and pressure checks, grounding, and venting, to make the system and equipment safe to work on; and apply such lockout/tagout tags to those switches, valves, vents, or other mechanical devices needed to preserve the safety provided. This operation is referred to as "Providing Safety Clearance."

#### C. Tag Removal

When any individual or group has completed its part of the work and is clear of the circuits or equipment, the supervisor, project leader, or individual for whom the equipment was tagged shall turn in his signed lockout/tagout tag stub to the Contractor. That group's or individual's lockout/tagout tags on equipment may then be removed on authorization by the Contractor.

#### 3.4 FALL HAZARD PROTECTION AND PREVENTION PROGRAM

Establish a fall protection and prevention program, for the protection of all employees exposed to fall hazards. Within the program include company policy, identify responsibilities, education and training requirements, fall hazard identification, prevention and control measures, inspection, storage, care and maintenance of fall protection equipment and rescue and evacuation procedures.

#### A. **Training**

Institute a fall protection training program. As part of the Fall Hazard Protection and Prevention Program, provide training for each employee who might be exposed to fall hazards. Provide training by a competent person for fall protection in accordance with USACE EM 385-1-1, Section 21.A.16.

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# B. Fall Protection Equipment and Systems

Enforce use of the fall protection equipment and systems designated for each specific work activity in the Fall Protection and Prevention Plan and/or AHA at all times when an employee is exposed to a fall hazard. Protect employees from fall hazards as specified in **USACE EM 385-1-1**, **section 21**. In addition to the required fall protection systems, safety skiff, personal floatation devices, life rings etc., are required when working above or next to water in accordance with **USACE EM 385-1-1**, **paragraphs 05.H. and 05.I**. Personal fall arrest systems are required when working from an articulating or extendible boom, swing stages, or suspended platform. In addition, personal fall arrest systems are required when operating other equipment such as scissor lifts if the work platform is capable of being positioned outside the wheelbase. The need for tying-off in such equipment is to prevent ejection of the employee from the equipment during raising, lowering, or travel. Fall protection must comply with **OSHA 29 CFR 1926.500**, **Fall Protection**, **Subpart M**, **and ASSE/SAFE A10.32**, **Fall Protection**.

# 1. Personal Fall Arrest Equipment

Personal fall arrest equipment, systems, subsystems, and components shall meet ASSE/SAFE Z359.1, Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components. Only a full-body harness with a shock-absorbing lanyard or self-retracting lanyard is an acceptable personal fall arrest body support device. Body belts may only be used as a positioning device system (for uses such as steel reinforcing assembly and in addition to an approved fall arrest system). Harnesses shall have a fall arrest attachment affixed to the body support (usually a Dorsal D-ring) and specifically designated for attachment to the rest of the system. Only locking snap

hooks and carabiners shall be used. Webbing, straps, and ropes shall be made of synthetic fiber. The maximum free fall distance when using fall arrest equipment shall not exceed 1.8 m 6 feet. The total fall distance and any swinging of the worker (pendulum-like motion) that can occur during a fall shall always be taken

# 2. Fall Protection for Roofing Work

Implement fall protection controls based on the type of roof being constructed and work being performed. Evaluate the roof area to be accessed for its structural integrity including weight-bearing capabilities for the projected loading.

- a. Low Sloped Roofs:
  - (i) For work within 6 feet (6 feet (1.8 m) of an edge, on low-slope roofs, Protect personnel from falling by use of personal fall arrest systems, guardrails, or safety nets.
  - (ii) For work greater than (6 feet (1.8 m) from an edge, erect and install warning lines in accordance with **OSHA 29 CFR 1926.500**, **Fall Protection**.
- **b.** Steep-Sloped Roofs: Work on steep-sloped roofs requires a personal fall arrest system, guardrails with toe-boards, or safety nets. This requirement also includes residential or housing type construction.

#### 3. Existing Anchorage

Certified (or re-certified) by a qualified person for fall protection existing anchorages, to be used for attachment of personal fall arrest equipment in accordance with ASSE/SAFE Z359.1, Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components. Exiting horizontal lifeline anchorages must be certified (or re-certified) by a registered professional engineer with experience in designing horizontal lifeline systems.

# 4. Horizontal Lifelines

Design, install, certify and use under the supervision of a qualified person horizontal lifelines for fall protection as part of a complete fall arrest system which maintains a safety factor of 2 (OSHA 29 CFR 1926.500 Fall Protection).

# 5. Guardrails and Safety Nets

Design, install and use guardrails and safety nets in accordance with 29 CFR 1926, Safety and Health Regulations for Construction Subpart M.

# 6. Rescue and Evacuation Procedures

When personal fall arrest systems are used, the contractor must ensure that the mishap victim can self-rescue or can be rescued promptly should a fall occur. Prepare a Rescue and Evacuation Plan and include a detailed discussion of the following: methods of rescue; methods of self-rescue; equipment used; training requirement; specialized training for the rescuers; procedures for requesting rescue and medical assistance; and transportation routes to a medical

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facility, Include the Rescue and Evacuation Plan within the Activity Hazard Analysis (AHA) for the phase of work, in the Fall Protection and Prevention (FP&P) Plan, and the Accident Prevention Plan (APP).

#### 3.5 **SCAFFOLDING**

- The Contractor shall provide all employees with a safe means of access to the work area on the scaffold in accordance with OSHA 29 CFR 1910.28 Safety Requirements For Scaffolding and as contained in this section.
  - Climbing of any scaffold braces or supports not specifically designed for access is prohibited.
  - Access scaffold platforms greater than 20 feet (6 m) maximum in height by use of a scaffold stair system.
  - Do not use vertical ladders commonly provided by scaffold system manufacturers for accessing scaffold platforms greater than 20 feet (6 m) maximum in height.
  - **4.** The use of an adequate gate is required.
  - 5. Ensure that employees are qualified to perform scaffold erection and dismantling.
  - Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan.
  - 7. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.
  - 8. Give special care to ensure scaffold systems are not overloaded. Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited.
  - 9. The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base. Place work platforms on mud sills. Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet. Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Activity Hazard Analysis (AHA) for the phase of work.

#### В. Stilts

The use of stilts for gaining additional height in construction, renovation, repair or maintenance work is PROHIBITED.

#### 3.6 **EQUIPMENT**

#### A. **Material Handling Equipment**

Material Handling Equipment shall be in accordance with OSHA 29 CFR 1910.178 Powered Industrial Trucks and as contained in this section.

- Material handling equipment such as forklifts shall not be modified with work platform 1. attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions.
- 2. The use of hooks on equipment for lifting of material must be in accordance with manufacturer's printed instructions.
- Operators of forklifts or power industrial trucks shall be licensed in accordance with OSHA.

#### В. Weight Handling Equipment

- Equip cranes and derricks as specified in ASME B30.5 or ASME B30.22 or ASME B30.8 as applicable.
- 2. Comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5). Perform all testing in accordance with the manufacturer's recommended procedures.

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- Comply with ASME B30.5 for mobile and locomotive cranes, ASME B30.22 for articulating boom cranes, ASME B30.3 for construction tower cranes, and ASME B30.8 for floating cranes and floating derricks.
- **4.** Under no circumstance shall a Contractor make a lift at or above 90% of the cranes rated capacity in any configuration.
- 5. When operating in the vicinity of overhead transmission lines, operators and riggers shall be alert to this special hazard and follow the requirements of ASME B30.5 or ASME B30.22 as applicable.
- **6.** Do not crane suspended personnel work platforms (baskets) unless the Contractor proves that using any other access to the work location would provide a greater hazard to the workers or is impossible. Do not lift personnel with a line hoist or friction crane.
- 7. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.
- 8. All employees must keep clear of loads about to be lifted and of suspended loads.
- **9.** Use cribbing when performing lifts on outriggers.
- **10.** The crane hook/block must be positioned directly over the load. Side loading of the crane is prohibited.
- 11. A physical barricade must be positioned to prevent personnel from entering the counterweight swing (tail swing) area of the crane.
- 12. Certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected shall always be available for review by CA.
- Written reports listing the load test procedures used along with any repairs or alterations performed on the crane shall be available for review by CA.
- **14.** Certify that all crane operators have been trained in proper use of all safety devices (e.g. antitwo block devices).

# C. USE OF EXPLOSIVES

Explosives shall not be used or brought to the project site without prior written approval from the CA. Such approval shall not relieve the Contractor of responsibility for injury to persons or for damage to property due to blasting operations. Storage of explosives, when permitted on State property, shall be only where directed and in approved storage facilities. These facilities shall be kept locked at all times except for inspection, delivery, and withdrawal of explosives. Explosive work shall be performed in accordance with the requirements of C.G.S. § 29-343 through 29-355 and as required by the Office of State Fire Marshal, CT Department of Construction Services.

# 3.7 EXCAVATIONS

A. Perform soil classification by a competent person in accordance with 29 CFR 1926 Safety and Health Regulations for Construction.

# 1. Utility Locations

All underground utilities in the work area must be positively identified by and coordinated in accordance with **Division 00, General Conditions, Article 18 Surveys, Permits, And Regulations.** All underground utilities in the work area must be positively identified by a private utility locating service and coordinated with the public utility company. Any markings made during the utility investigation must be maintained by the General Contractor throughout the contract.

# 2. Utility Location Verification

The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system. Digging within **Two (2) feet (610 mm)** of a known utility

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must not be performed by means of mechanical equipment; hand digging shall be used. If construction is parallel to an existing utility expose the utility by hand digging every 100 feet (30.5 m) if parallel within Five (5) feet (1.5 m) of the excavation.

# 3. Shoring Systems

Trench and shoring systems must be identified in the accepted safety plan and AHA. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review. Job-made shoring or shielding must have the registered professional engineer stamp, specifications, and tabulated data. Extreme care must be used when excavating near direct burial electric underground cables.

# 4. Trenching Machinery

Operate trenching machines with digging chain drives only when the spotters/laborers are in plain view of the operator. Provide operator and spotters/laborers training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating. Keep documentation of the training on file at the project site.

#### 3.8 UTILITIES WITHIN CONCRETE SLABS

A. Utilities located within concrete slabs or pier structures, bridges, and the like, are extremely difficult to identify due to the reinforcing steel used in the construction of these structures. Whenever contract work involves concrete chipping, saw cutting, or core drilling, the existing utility location must be coordinated with utility company in addition to a private locating service. Outages to isolate utility systems must be used in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

#### 3.9 ELECTRICAL

#### A. Conduct of Electrical Work

Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables that will be cut must be positively identified and de-energized prior to performing each cut. Positive cable identification must be made prior to submitting any outage request for electrical systems. Arrangements are to be coordinated with the CA and utility company for identification. The CA will not accept an outage request until the Contractor satisfactorily documents that the circuits have been clearly identified. Perform all high voltage cable cutting remotely using hydraulic cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers will be permitted to enter. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personal protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. In addition, provide electrical arc flash protection for personnel as required by NFPA 70E. Insulating blankets, hearing protection, and switching suits may also be required, depending on the specific job and as delineated in the Contractor's AHA.

#### B. Portable Extension Cords

Size portable extension cords in accordance with manufacturer ratings for the tool to be powered and protected from damage. Immediately remove from service all damaged extension cords. Portable extension cords shall meet the requirements of **NFPA 70**.

# 3.10 WORK IN CONFINED SPACES

- A. Comply with the requirements in OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b) (6). Any potential for a hazard in the confined space requires a permit system to be used.
  - 1. Entry Procedures. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented. All hazards pertaining to the space shall be reviewed with each employee during review of the AHA.
  - 2. Forced air ventilation is required for all confined space entry operations and the minimum air exchange requirements must be maintained to ensure exposure to any hazardous atmosphere is kept below its' action level.
  - Sewer wet wells require continuous atmosphere monitoring with audible alarm for toxic gas detection.

### **PART 1 - GENERAL**

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 DEFINITIONS

- A. General: Basic contract definitions are included in the General Conditions of the Contract for Construction.
- **B.** "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, or other paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the reader locate the reference. Location is not limited to this term.
- C. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases.
- D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the Architect's duties and responsibilities as stated in the Conditions of the Contract.
- **E.** "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- **F.** "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
- **G.** "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
  - 1. The term "experienced," when used with the term "installer," means having a minimum of five (5) previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of authorities having jurisdiction.
  - 2. Trades: Using terms such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.
  - 3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no option. However, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
    - a. This requirement shall not be interpreted to conflict with enforcing building codes and similar regulations governing the Work. It is also not intended to interfere with local trade-union jurisdictional settlements and similar conventions.
- J. "Project Site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other Work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

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#### 1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- **A. Specification Format:** These Specifications are organized into Divisions and Sections based on CSI's "MasterFormat" 49-Division format and numbering system.
- **B. Specification Content:** This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
  - Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated.
    Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be
    interpolated, as the sense requires. Singular words will be interpreted as plural and plural words
    interpreted as singular where applicable as the context of the Contract Documents indicates.
  - 2. Streamlined Language: The Specifications generally use the imperative mood and streamlined language. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.
    - a. The words "shall be" are implied where a colon (:) is used within a sentence or phrase.

### 1.4 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- **B.** Publication Dates: Comply with the standards in effect as of the date of the Contract Documents unless a specific date is indicated in the Contract Documents or the governing regulations cited herein.
- C. Conflicting Requirements: Where compliance with two (2) or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent and highest quality requirement. Request a decision from the Architect before proceeding on requirements that are different but apparently equal, and where it is uncertain which requirement is the most stringent.
  - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum acceptable. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Request a clarification from the Architect regarding uncertainties before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
  - 1. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.
- **E. Abbreviations and Names:** Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Thompson Gale's "Encyclopedia of Associations," available in most libraries.

# 1.5 GOVERNING REGULATIONS AND AUTHORITIES

- A. Copies of Regulations: Obtain copies of the "latest applicable State Codes" and the following regulations and retain at the Project Site to be available for reference by parties who have a reasonable need during submittals, planning, and progress of the Work, until Substantial Completion.
  - 1. Connecticut State Building Code 2005
    - 1.1 CT Amendments 2009, 2011 and 2013.
    - 1.2 International Building Code 2003
    - 1.3 International Existing Building Code N/A
    - 1.4 International Mechanical Code 2003 with 2005 and 2009 Ct. Amendments
    - 1.5 International Plumbing Code 2003 with 2005 and 2009 Ct. Amendments

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- 1.6 International Energy Conservation Code 2009 with 2011 Ct. Amendments
- 1.7 National Electric Code (NFPA 70) 2011 with 2013 Ct. Amendments
- 1.8 ICC/ANSI A117.1-Accessible and Usable Buildings and Facilities -2003 with 2005 and 2009 Ct. Amendments
- 2. Connecticut Fire Safety Code 2005
  - 2.1 CT Amendments 2009 and 2012
  - 2.2 International Fire Safety Code 2003
  - 2.3 NFPA 101 2001
- 3. Connecticut Fire Prevention Code 2010
- 4. Occupational Safety and Health Administration (OSHA)
  - 4.1 OSHA 29 CFR Part 1910 Occupational Safety and Health Regulations.
  - **4.2** OSHA 29 CFR Part 1926 Occupational Safety and Health Regulations for Construction.
- **B.** The "latest applicable State Codes" are available for download from the DAS website (<a href="www.ct.gov/das">www.ct.gov/das</a>) > Doing Business With The State > State Building Construction > Publications and Forms > Office of State Building Inspector and Office of State Fire Marshal. Also visit the <a href="www.ctdol.state.ct.us">www.ctdol.state.ct.us</a> Connecticut Department of Labor website.

### 1.6 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 42 20

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### **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for quality-control services.
- B. Quality-Control services include fire alarm acceptance testing, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by the Owner.
- C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
- D. Requirements of this Section relate to customized fabrication and installation procedures, not production of standard products.
  - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
  - 2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
  - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- E. Related Sections: The following Sections contain requirements that relate to this Section:
  - Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for development of a schedule of required tests and inspections.
  - 2. Division 01 Section 01 73 29 "Cutting and Patching" specifies requirements for repair and restoration of construction disturbed by inspection and testing activities.
  - 3. Division 01 Section 01 77 00 "Closeout Procedures", specific requirements for contract closeout procedures.
  - Division 28 Section 28 31 11 "Digital, Addressable Fire-Alarm System" specifies field quality control for the Alarm System.

# 1.3 RESPONSIBILITIES

- A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, the Owner, through the Construction Administrator, shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. All tests required by the individual specification sections are required to be scheduled and notification given to the Construction Administrator 24/48 hours in advance of the test/inspection as applicable. Costs for these services are not included in the Contract Sum.
  - Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.
  - Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner's responsibility, the Owner will employ and pay a qualified independent testing agency to perform those services.
    - Such services include Special Inspections as required by the latest edition of the "Connecticut State Building Code".
    - b) Where the Owner has engaged a testing agency for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner. The Owner will engage the services of a qualified Special Inspector for this project. The Special Inspector, as a representative of the Owner, shall

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- document and confirm compliance with the provisions of the Connecticut State Building Code for Special Inspections.
- c) Materials and assemblies for this project will be tested and construction operations inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the State for final acceptance.
- d) The Owner's use of testing and inspection services shall in no way relieve the Contractor of the responsibility to furnish materials and finished construction in full compliance with the Contract Documents and the Connecticut State Building Code.
- B. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.
  - The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility
    where required tests performed on original construction indicated non-compliance with Contract
    Document requirements.
  - The Owner will issue a credit change order to cover all costs incurred related to all re-tests/re-inspections due to non-compliance to the Contract Documents, including but not limited to the Owner's costs and the Consultant's costs.
- C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the Agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:
  - 1. Provide access to the Work.
  - 2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
  - Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
  - 4. Provide facilities for storage and curing of test samples.
  - 5. Deliver samples to testing laboratories.
  - Provide an approved design mix proposed for use for material mixes that require control by the testing agency.
  - 7. Provide security and protection of samples and test equipment at the Project Site.
- D. Duties of the Testing Agency: The independent testing agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Construction Administrator, Architect and the Contractor in performance of the testing agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.
  - 1. The testing agency shall notify the Construction Administrator and the Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
  - The testing agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
  - 3. The testing agency shall not perform any duties of the Contractor.
- E. Owner will pay for the services of an independent testing agency laboratory to perform inspections, tests and other services required by the Specifications except as noted below, listed for which the Owner will issue a deduct change order to cover the cost associated with these tests:
  - When the Contractor notifies the Construction Administrator and/or Testing Agency less than 24 hours before the expected time of testing.
  - 2. When the Contractor requires testing for his own convenience.
  - 3. When the Contractor schedules a test and is not ready for the required test.
- F. Submit reports of tests that are part of the submittal requirements which indicate compliance or non-compliance with the specified standard.
- G. See also General Conditions Article 16 "Inspections & Tests".
- H. Fire Alarm/Acceptance Testing Procedures:

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- For **all** buildings (exceeding the threshold limit and not exceeding the threshold limit), the fire alarm testing shall be as the authority having jurisdiction shall dictate. This will be as determined by the Office of the State Fire Marshal (OSFM), and shall include, but not be limited to, the requirements as set below:
  - Protective Signaling Systems: All protective signaling systems shall meet with acceptance testing requirements of the applicable standards listed in Section 7-6.1.4, NFPA 101/2003 and NFPA 13/2002.
  - Prior Test Notification: At least five (5) working days prior to testing, the Fire Alarm Contractor shall notify (in writing) the following people of the proposed date the acceptance tests are to be performed (Also, see Part 2 of Certificate of Compliance).
    - Department of Administrative Services OSFM Representative
    - **General Contractor**
    - **Engineer of Record**
    - **Equipment Supplier Representative**
    - Sprinkler Contractor

# Certificates of Compliance:

- 1) A Fire Alarm System Inspection and Testing Certification and Description form shall be prepared for each system (See NFPA 72/2002 Chapter 7 and Figure 7-5.2.2).
- Parts 1 and 3 through 9, shall be completed after the system is installed and the installation of the wiring has been checked. Every alarm device must also be pre-tested to ensure proper operation and correct annunciation at each remote annunciator and control panel. Part 1 of the form (Certification of System Installation) shall be signed by the fire alarm contractor. The signed and completed preliminary copies of the Certification form shall be forwarded to all parties along with the Prior Test Notification.
- Part 2, of each applicable form, shall be completed after the operational tests have been completed.
- After the completion of the operational acceptance tests and sign-off of test witness (with stipulations noted), final copies of the Certificates shall be forwarded to the Department of Construction Services Representatives.

### d. Tests:

- 1) All tests shall be conducted in accordance with the Manufacturer's Testing Recommendations.
- All testing equipment, apparatus (i.e. sound level decibel meter, 2-way radio communication, test devices, ladders, tools, lighting, etc.) and personnel shall be supplied by the Fire Alarm Contractor and Sprinkler Contractor.
- System Documentation: Every system shall include the following documentation, which shall be delivered to the Department of Construction Services Representatives upon final acceptance of the An owner's manual or manufacturer's installation instructions covering all system equipment, including the following:
  - 1) A detailed narrative description of the system inputs, evacuation signaling, ancillary functions, annunciation, intended sequence of operations, expansion capability, application considerations, and limitations.
  - Operator's instructions for basic systems operations including alarm acknowledgment, system reset, interpreting system output (LED's CRT display, and printout), operation of manual evacuation signaling and ancillary function controls, changing printer paper, etc.
  - A detailed description of routine maintenance and testing as required and recommended and as would be provided under a maintenance contract, including testing and maintenance instructions for each type of device installed. This information should include:
    - A listing of individual system components that require periodic testing and maintenance. (a)
    - (b) Step by step instructions detailing the requisite testing and maintenance procedures and the intervals at which those procedures should be performed.

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- (c) A schedule that correlates the testing and maintenance procedures required by paragraph (2) above and with the listing required by paragraph (1) above.
- Detailed troubleshooting instructions for each type of trouble condition recognized by the system, including opens, grounds, parity errors, "loop failures," etc. These instructions should include a list of all trouble signals, and step by step instructions describing how to isolate those problems and correct them (or call for service as appropriate).
- A service directory, including a list of names and telephone numbers for those who should be called to service the system.

# As-Built Drawings:

1) The Contractor will produce two (2) sets of as-built drawings and specifications for the fire alarm system, indicating the location (and programmed address, if applicable) of all devices and appliances, the wiring sequences, wiring methods, connection of the components, and sequence of operation of the protective signaling system as installed, shall be given to the Department of Construction Services representatives. This shall be in Accordance with NFPA 72. Refer also to Section 01 77 00 "Closeout Procedures".

#### 1.4 **SUBMITTALS**

- Unless the Contractor is responsible for this service, the independent testing agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Construction Administrator. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
  - Submit additional copies of each written report directly to the governing authority, when the authority so
  - Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
    - a. Date of issue.
    - Project title and number.
    - Name, address, and telephone number of testing agency. c.
    - d. Dates and locations of samples and tests or inspections.
    - Names of individuals making the inspection or test. e.
    - Designation of the Work and test method. f.
    - Identification of product and Specification Section. a.
    - h. Complete inspection or test data.
    - i. Test results and an interpretation of test results.
    - Ambient conditions at the time of sample taking and testing. j.
    - Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
    - Name and signature of laboratory inspector. I.
    - Recommendations on re-testing.

#### QUALITY ASSURANCE 1.5

- Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the National Voluntary Laboratory Accreditation Program and that specialize in the types of inspections and tests to be performed.
  - Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.
- B. Mockups: Provide full-size, physical assemblies that are constructed on-site. Mockups will be used to verify selections made under sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not samples. Approved mockups establish the standard by which the Work will be judged.

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# PART 2 - PRODUCTS (Not Applicable)

# **PART 3 - EXECUTION**

# 3.1 MOCKUPS

- A. Build site-assembled mockups using installers who will perform same tasks for project.
- **B.** Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect
  - Notify Architect and Construction Administrator seven (7) days in advance of dates and times when mockups will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - Obtain Architect's and Construction Administrator's approval of mockups before starting work, fabrication, or construction.
  - Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 6. Demolish and remove mockups when directed, unless otherwise indicated.

### 3.2 REPAIR AND PROTECTION

- A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 01 Section 01 73 29 "Cutting and Patching."
- B. Protect constructions exposed by or for quality-control service activities, and protect repaired construction.
- C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 01 45 00

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# **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including Division 00 General Conditions of the Contract for Construction for Design-Bid-Build and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

- **A.** This Section includes requirements for identification badges, parking stickers, construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection.
- **B.** Temporary utilities include, but are not limited to, the following:
  - 1. Temporary water service and distribution.
  - 2. Temporary electric power and lighting services.
  - 3. Temporary heating, cooling and ventilation
  - 4. Temporary telephone service and data.
  - 5. Temporary sanitary facilities, including drinking water.
  - 6. Storm and sanitary sewer.
  - 7. Storm water pollution control.
- **C.** Support facilities include, but are not limited to, the following:
  - Field offices Contractor, Subcontractor, Owner, and Construction Administrator.
  - 2. Storage and fabrication sheds.
  - 3. Temporary roads and paving.
  - 4. Dewatering facilities and drains.
  - 5. Temporary enclosures.
  - 6. Temporary lifts and hoists.
  - 7. Temporary project identification signs.
  - 8. Temporary exterior lighting.
  - 9. Collection and disposal of waste and cleaning.
  - 10. Temporary Environmental Controls.
  - 11. Stairs
- **D.** Security and protection facilities include, but are not limited to, the following:
  - 1. Temporary fire protection.
  - 2. Permanent fire protection.
  - 3. Security for site and Agency.
  - 4. Barricades, warning signs, and lights.
  - 5. Enclosure fence.
  - 6. Security enclosure and lockup.
  - 7. Protection.
  - 8. Environmental protection.
  - 9. Traffic ways.
  - 10. Identification badges for Contractor's personnel & parking stickers.

# 1.3 RELATED SECTIONS

**A.** Division 01 Section 01 57 30 "Indoor Environmental Control" for additional provisions governing temporary heating, ventilating and air conditioning.

### 1.4 SUBMITTALS

- A. Temporary Utilities: Submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- **B.** Implementation and Termination Schedule: Within twenty-one (21) days of the date established for commencement of the Work, submit a schedule indicating implementation and termination of each temporary utility.

# 1.5 QUALITY ASSURANCE

- **A. Regulations:** Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:
  - 1. Building and fire code requirements.
  - 2. Health and safety regulations.
  - 3. Utility company regulations.
  - 4. Police, fire department, and rescue squad rules.
  - 5. Environmental protection regulations.
  - 6. Americans with Disabilities Act.
- B. Standards: OSHA. Comply with NFPA 241 "Standard for Safeguarding Construction, Alteration, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA 200 "Recommended Practice for Installing and Maintaining Temporary Electric Power at Construction Sites."
  - 1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."
- **C. Inspections:** Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

## 1.6 PROJECT CONDITIONS

- **A. Temporary Utilities:** Prepare a schedule indicating dates for implementation and termination of each temporary utility. At the earliest feasible time, when acceptable to the Owner, the Construction Administrator will direct the change over from use of temporary service to use of permanent service.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

# **PART 2 - PRODUCTS**

## 2.1 MATERIALS

- A. General: Provide new materials. If acceptable to the Architect, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.
- B. Lumber and Plywood: Comply with requirements in Division 06 Section 06 10 00 "Rough Carpentry."
  - **1.** For signs and directory boards, provide 3/4-inch exterior grade, Grade A-B Fir plywood. Mount sign on preservative treated Fir posts.
    - **a.** Project sign shall be 4' x 8' painted and supported on 4-inch x 4-inch posts, of a design to be provided by the Owner via the Construction Administrator.

- **2. Vision Barriers:** Provide minimum 1/2-inch thick exterior plywood.
- **3.** For safety barriers, sidewalk bridges, and similar uses, provide minimum 5/8-inch thick exterior plywood.
- C. Paint: Comply with requirements of Division 09 Section 09 91 00 "Painting."
  - For sign and directory boards applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer unless otherwise indicated.
- **D. Tarpaulins:** Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.
- **E. Water:** Provide potable water approved by local health authorities.
- **F. Enclosure Fencing:** Provide 0.120-inch thick, galvanized 2-inch chain link fabric fencing six (8) feet high galvanized steel pipe posts, 1-1/2 inches knuckle both bottom and top I.D. for line posts and 2-1/2 inches I.D. for corner posts.

### 2.2 EQUIPMENT

- **A. General:** Provide new equipment. If acceptable to the Architect, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.
  - The Contractor shall furnish tools, apparatus and appliances, hoists and/or cranes and power for same, scaffolding, runways, ladders, temporary supports and bracing and similar work or material necessary to insure convenience and safety in the execution of the Contract except where this is otherwise specified in any Specification Section. All such items shall meet the approval of the Owner but responsibility for design, strength and safety shall remain with the Contractor. All such items shall comply with Federal OSHA regulations and applicable codes, statutes, rules and regulations, including compliance with the requirements of the current edition of the "Manual of Accident Prevention in Construction" published by the Associated General Contractors (AGC) and the standards of the State Labor Department.
  - 2. Staging, exterior and interior, required for the execution of this Contract, shall be furnished, erected, relocated if necessary and removed by the General Contractor. Staging shall be maintained in a safe condition without charge to and for the use of all trades as needed.
- **B. Water Hoses:** Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge and backflow preventers.
- **C. Electrical Outlets:** Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.
- D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where exposed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
- **E.** Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage. Provide exterior fixtures where exposed to moisture.
- F. Heating Units: Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed.
- **G. Temporary Field Offices:** Provide prefabricated or mobile units with lockable entrances, operable windows, and serviceable finishes. Provide heated and air-conditioned units on foundations adequate for normal loading.
- H. Temporary Toilet Units: The Agency will NOT allow the toilets located in Campus buildings for Contractor use. If others are needed, provide self-contained, single-occupant toilet units of the chemical, aerated recirculation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

- Fire Extinguishers: Provide hand-carried, portable, UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, drychemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.
  - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

# **PART 3 - EXECUTION**

#### 3.1 INSTALLATION

- A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.
- **B.** Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

### C. Storm Water Pollution Control:

- 1. The Architect/Engineer shall electronically register the Connecticut Department of Energy and Environmental Protection's (DEEP) "General Permit for the Discharge of Stormwater and Dewatering Wastewater from Construction Activities" (DEEP-WPED-GP-015) and Stormwater Pollution Control Plan (SPCP) through the **DEEP ezFile Portal**. The SPCP is attached to technical Section 31 25 13 "Erosion and Sedimentation Control".
- 2. Once under contract, and prior to construction activities, the Contractor shall assume responsibility for storm water pollution control and conform to the General Permit obligations and requirements. The Contractor shall sign, and cause to be signed by each appropriate Subcontractor, the "Contractor Certification Statement" section of the SPCP and the DEEP "License Transfer Form" (DEEP-APP-006), as directed by the Architect/Engineer. The signed Certification Statement and License Transfer Form shall be attached to the "on-site" SPCP and submitted to the DEEP by the Architect/Engineer.
- **3.** The Owner shall be responsible for the General Permit registration fee and License Transfer notification fee.
- **4.** The Contractor shall retain an updated copy of the SPCP at the construction site from the date construction is initiated at the site until the date construction at the site is completed.
- 5. The Contractor shall conform to the SPCP or use another plan, prepared at the Contractor's expense, which has been approved by the Owner and the DEEP *prior to construction activities*. The Contractor shall be responsible for implementing, maintaining, and updating the SPCP, including, but not limited to, performing regular inspections, conducting and reporting all stormwater monitoring activities, retaining records for the required period of time, and performing *all* post-construction measures and inspections.
- 6. The Contractor shall ensure all post-construction measures are installed, cleaned, and functioning and the site has been stabilized for at least **three (3) months** following the cessation of construction activities in order for the project to be considered complete. A site is considered stabilized when there is no active erosion or sedimentation present and no disturbed areas remain exposed for **all phases**. Once the site has been stabilized for at least three (3) months, the Contractor shall have the site inspected by a Qualified Inspector to confirm final stabilization. If stabilized, the Contractor shall submit a Notice of Termination (DEP-PED-NOT-015) to the DEEP in order to terminate the Construction Stormwater General Permit.
- 7. The Contractor shall submit a final copy of the SPCP, the Notice of Termination, and all inspection records to the Architect/Engineer and DAS/CS Project Manager at completion of all post-construction measures.
- **8.** The Contractor shall retain copies of the SPCP and all reports required by the General Permit, and records of all data used to complete the registration for the General Permit, for a period of at least five (5) years from the date that the project is complete. Inspection records must be retained as part of the SPCP for a period of five (5) years after the date of inspection.

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9. For sites involving total soil disturbance of less than one (1) acre, the Contractor shall be responsible for sediment and erosion control and utilize best management practices as identified in the "2002 Connecticut Guidelines for Soil Erosion and Sediment Control" (DEEP Bulletin 34), as amended, and any sediment and erosion control plans prepared for the project.

### 3.2 TEMPORARY UTILITY INSTALLATION

- **A. General:** Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.
  - **1.** Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
  - Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.
  - **3.** Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
  - 4. Use Charges: If cost or use charges for temporary facilities are specified by this section to be borne by the Owner the cost or use charges for temporary facilities will be borne not longer than thirty (30) days after final acceptance of the project.

# B. Temporary Water Service and Distribution:

- Install water service and distribution piping of sizes and pressures adequate for construction until permanent water service is in use.
  - **a. Sterilization:** Sterilize temporary water piping prior to use.
- 2. Water for construction purposes may be taken from the existing service. The Contractor shall provide connections, approved backflow prevention device, meter and pipe to the water main or nearest hydrant, subject to the approval of the Owner. Upon completion of work, the Contractor shall remove the temporary connections and backfill if necessary. If new water service is installed before construction is complete, the new system may be used provided it is returned to the Owner in as-new condition. The Contractor shall pay for the water used, as metered.

# C. Temporary Electric Power and Lighting Services:

- 1. Power and lighting may be taken from the power company's nearest pole with temporary poles, if needed, to extend the line to project. If permanent power lines have been installed before beginning project, then temporary lines can be brought in from the last pole.
- 2. Provide service required for construction with branch wiring and distribution boxes located to provide power and lighting by construction-type extension cords. Meter shall be provided and installed by the Contractor.
- **3.** The Contractor shall pay all costs of temporary power and light.
- 4. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
- 5. **Temporary Lighting:** When overhead floor or roof deck has been installed, provide temporary lighting with local switching. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

# D. Temporary Heating, Cooling and Ventilating:

- 1. Provide temporary heat required by construction activities for curing or drying of completed installations or for protection of installed construction from adverse effects of low temperatures or high humidity. Select safe equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce the ambient condition required and minimize consumption of energy.
  - a. Heating Facilities: Except where the Owner authorizes use of the permanent system, provide vented, self-contained, LP-gas or fuel oil heaters with individual space thermostatic control.

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- **b.** Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.
- 2. Provide temporary heat during construction for interior areas included in the Contract to counteract low temperatures or excessive dampness. Maintain during said period or periods until final completion of the Contract, unless otherwise approved by the Owner in writing. Windows, doors, ventilators and similar openings shall be temporarily closed. Provide heat and ventilation to maintain specified conditions for construction operations and to protect materials and finishes from damage by temperature or humidity. The permanent heating system is not to be used for temporary heating unless approved, in writing, by the Owner. If approved, use of the permanent heating system by the Contractor does not constitute beneficial use by the Owner. The warrantee for said system will not commence until Substantial Completion is granted. Costs shall be paid by the Contractor. See individual Sections for temperature/humidity limits. Temporary heating methods shall comply with OSHA regulations and other applicable codes, statutes, rules and regulations and shall be approved by the Architect/Engineer and Owner.
- 3. Permanent air handling equipment, when used for temporary heating, shall be equipped with disposable "construction" filters. The construction filters shall have an average efficiency at least equal to the filters specified under Division 23, but not less than 30 percent when tested in accordance with ASHRAE 52.2 "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size." The filters shall have an average arrestance of not less than 90 percent efficiency on one (1) micron size particles. Before turning over the system for final acceptance, the contractor shall remove and dispose of the construction filters; clean the ductwork; spray clean the heating and cooling coils, and drain pans to "like new" condition; and install the filters specified in Division 23 Section 23 40 00 "HVAC Air Cleaning Devices."
- 4. The Contractor may use the existing heating system with temporary extensions, radiators or unit heaters, but such use is subject to the Owner's approval. Coordinate use of existing facilities with Owner. Provide additional, temporary extensions and units to satisfy the criteria given in the preceding paragraph. Owner will pay cost of energy used. Take measures to conserve energy. At the termination of construction, return the facilities to their original condition. Before operation of permanent facilities, verify that installation is approved for operation and that filters are in place.
- 5. Steam from the Agency's lines shall be metered and paid for by the Contractor at a price approved by the Agency and Owner. The Contractor shall arrange with his Heating Subcontractor to install and maintain temporary piping, radiators or unit heaters, reducing valves, steam traps and other necessary fittings and accessories. Traps shall be provided to prevent steam from entering main returns. The temporary layout shall meet the approval of the Architect/Engineer. Condensate meter (or meters) shall be installed to record usage of steam.

At the termination of construction, return the facilities to their original condition.

- **6.** Refer to Section 01 57 30 "Indoor Environmental Control" for additional requirements regarding means and methods of providing temporary heating, cooling and ventilating. Meet manufacturer's standards for minimum and maximum temperatures and humidity governing installation of materials and systems.
- E. Temporary Telephone Service and Data: Provide temporary telephone service throughout the construction period for all personnel engaged in construction activities. Install telephone on a separate line for each temporary office and first aid station. Contractor shall provide telephone service in his office and separate telephone service in the CT DCS Office and Construction Administrator's Office, if provided. It is preferred that the Contractor use a cellular phone. Basic service and local calls will be paid for by the Contractor. Toll calls will be paid for by the respective users.
  - Separate Telephone Lines: Provide additional telephone lines for the following:
    - **a.** Where an office has more than **two (2)** occupants, install a telephone for each additional occupant or pair of occupants.
    - b. Provide dedicated telephone lines for a separate fax machine in both the Contractor's office and the CT DCS/CA office.
  - **2.** At each telephone, post a list of important telephone numbers.
- **F. Temporary Sanitary Facilities, Including Drinking Water:** Temporary sanitary facilities include temporary toilets, wash facilities, and drinking-water fixtures. Comply with regulations and health codes

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for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

- Provide toilet tissue, wash basins with water, soap and paper towels, paper cups, and similar disposable materials for each facility. Provide covered waste containers for used material. The Contractor shall maintain the facilities in a sanitary condition.
- Toilets: The Contractor shall install self-contained chemical toilet units. Shield toilets to ensure privacy. Use of pit-type privies will not be permitted. Provide separate facilities for male and female personnel.
- **3. Water Coolers:** Where power is accessible, provide electric hot/cold water coolers to maintain dispensed cold water temperature at 45 to 55 degrees F. Provide bottled water service and cup supplies and maintain in a clean sanitary condition.
- **G. Storm and Sanitary Sewer:** If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully.
  - 1. Filter out excessive amounts of soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
  - 2. Connect temporary sewers to the municipal system, as directed by sewer department officials.
  - **3.** Maintain temporary sewers and drainage facilities in a clean, sanitary condition. Following heavy use, restore normal conditions promptly.
- H. Storm Water Pollution Control: Provide earthen embankments and similar barriers in and around excavations and sub-grade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

### 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Locate field offices, storage sheds, and other temporary construction and support facilities in designated area as shown on the Contract Documents. The location of the trailers on the Drawings is diagrammatic in nature. Final placement of the trailers is to be approved by the Construction Administrator.
  - Maintain support facilities until Final Completion. Remove prior to Final Completion with permission from the Owner.
- **B. Field Offices:** Provide insulated, weathertight temporary offices of sufficient size to accommodate required office personnel at the Project Site. Keep all offices clean and orderly, sweep weekly and remove rubbish on a daily basis. Furnish and equip offices as follows:
  - 1. The Contractor shall provide an office for their own use and a method to contact them by e-mail and telephone at any point and time.
  - 2. Owner and Construction Administrator's Field Offices / Equipment: The General Contractor shall provide a field office for the Owner and Construction Administrator. The field office shall be one (1) single wide trailer 12' x 60'. The trailer shall have to be in "new condition" as determined by the Construction Administrator. The trailer shall have a minimum of two (2) offices, each with a minimum of 150 square feet each, and a main meeting area. The trailers shall have ample natural light, heating of sufficient capacity to maintain 70 degrees (F) in winter and air conditioning of sufficient capacity to maintain 70 degrees (F) in summer. The operational noise level of the supplied HVAC systems shall be low enough so as not to impede the conducting of meetings. The General Contractor shall provide a 5-lb. ABC fire extinguisher and an OSHA- approved first aid kit. The General Contractor shall provide the following furniture, and equipment which will remain his property. The furniture may be used but shall be in good condition as judged by the Owner and Construction Administrator.
    - 2.1 The General Contractor shall provide (2) two lockable chemical toilet(s) with toilet tissue for the owners' use in both units. Provide one male and one female portable bathroom to be located adjacent to the Owners/Construction Administrators Trailer. The General Contractor shall provide hand wash and maintain the facility in a sanitary condition daily. (See Section 01 52 19 Temporary Sanitary Facilities).

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	The General Contractor shall provide a working bathroom within the trailer with running water and sanitary tie in with proper heat trace and insulation. If a sanitary tie in is not feasible, because the connection point is not within proximity to the trailer and the sanitary run would be to long, provide a sanitary tank set up with proper heat trace and insulation to withstand cold weather months and prevent freeze up of sanitary and water lines. The General Contractor shall provide hand wash and maintain the facility in a sanitary condition daily.					
2.2	Two (2) Lockable, double-pedestal, office desks, each with an executive chair.					
2.3	Two (2) Plan tables.					
2.4	Two (2) Plan racks with sticks.					
2.5	Twenty (20) Conference chairs and a conference table (approx. 5 feet x 12 feet).					
2.6	Two (2) Side tables (approx. 3 feet x 5 feet).					
2.7	Two (2) Wall mounted, cork display boards (4-foot x 6 foot).					
2.8	Two (2) Wall mounted, white, wipe-off board, with markers (3-foot x 4 foot).					
2.9	Four (4) File cabinets (lockable four drawer legal size).					
2.10	Two (2) Bookshelves each with 10 linear feet x 12-inch-wide shelving.					
2.11	Two (2) Large capacity waste receptacles.					
2.12	One (1) Plain paper, Fax Machine with dedicated telephone line approved by Owner.					
2.13	Two (2) Telephones with telephone lines and voice mail.					
2.14	Two (2) Telephones data lines (dedicated to computer use) with high-speed Internet connection (minimum of DSL or cable modem service 200MB/S).					
2.15	Provide a network set up and server capable of managing two computers and the all in one printer. Computers will be provided by others.					
2.16	(1) Full size all in one printer scanner copier machine to handle medium capacity work volume (30 Copies/minute) as approved by the Construction Administrator. Shall be capable of color printing and handling letter legal and 11 x 17-page sizes. Provide maintenance of this machine and ink cartridges throughout the duration of the project.					
2.17	Provide printer paper as needed, plan for a minimum of 4 boxes of letter and 1 box of 11 x 17 paper a month and adjust to meet project demands. Additional paper will be requested by the Construction Administrator as required.					
2.18	Provide Wireless and hardwired internet service for two work stations with minimum speed of 200MB/Second with 8 additional network ports-available for other devices or guests. Provide coordination with the Construction administrator for set up of server equipment.					
2.19	Provide all necessary office supplies suitable for two people throughout the project duration. This should include a sufficient supply of pens, high lighters, staplers, staples, paperclips, notebooks, post-its,1 large stapler and staples up to 1 inch, etc. Provide additional supplies upon the request of the Owner or Construction administrator.					
2.20	Provide drinking water suitable for (2) people over the duration of the project.					
2.21	Provide two high resolution digital cameras for documentation purposes. Provide (2) 264 GB memory sticks.					
2.22	Provide 2 (1) terabyte external hard drives.					

# 3. Miscellaneous Computer Requirements

The initial condition of the computer system shall be nearly pristine. All owner installed e-mail accounts, games, spyware, online services, applications, network or other profiles previously set up on the system shall be removed prior to placement in the field office. If the system was provided for a previous CT DAS / DCS contract, all software not specified shall be removed prior to placement in the current field office.

3.1 The General Contractor shall provide all cables, connections and software required to connect the field office computer system to the printer and the scanner.

- 3.2 When more than one computer system is specified for a field office, the General Contractor shall provide either an Ethernet or wireless office network to allow all computer systems in the field office to access the field office internet service, the printer and the scanner.
- 3.3 The General Contractor shall provide appropriate dust covers for all field office desktop computer systems.
- 3.4 The General Contractor shall provide all manuals necessary for operation of the computer system and software with the system and shall include all documentation normally furnished with the equipment and software when purchased.
- 3.5 The Owner will be utilizing the computer system to run or access Owner provided construction management software applications. These applications are known to run on Intel and AMD compatible equipment when using the latest windows operating system. If the Owner experiences problems running these applications due to hardware or software compatibility, the General Contractor shall replace the equipment to ensure compatibility to the satisfaction of the Owner within five (5) business days.
- 3.6 The computer system shall be maintained in good working order. If a portion of the system becomes defective, inoperable, damaged, or stolen, that portion shall be repaired or replaced within **five (5)** business days after the General Contractor is notified by the Owner. If the computer system and related accessories are not maintained by the Design-Builder as required, the Owner may withhold partial payments until the computer system is operational to the Owner's satisfaction.

### 4. Field Office Internet Service:

The General Contractor shall provide broadband internet service for the field office. Broadband internet service shall be capable of a minimum average upload speed of **200MB/Second** unless otherwise approved by the Owner.

- 5. When the Contractor supplies the trailer(s) they shall equip each trailer with a water cooler for hot and cold water.
- C. Storage and Fabrication Sheds: Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on-site.
  - 1. Storage sheds for tools, materials and equipment shall be weathertight with heat, lighting and ventilation for products requiring controlled conditions.
  - 2. Remove temporary materials, equipment services and construction before Substantial Completion.
  - 3. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to specified or original condition.
- D. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 31 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.
- **E. Temporary Enclosures**: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.
  - Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
  - 2. Install tarpaulins securely, with incombustible wood framing and other materials. Close openings of 25-sq ft or less with plywood or similar materials.
  - Close openings through floor or roof decks and horizontal surfaces with load-bearing, woodframed construction.
  - **4.** Where temporary enclosure exceeds 100-sq ft in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.
- F. Temporary Lifts, Hoists and Elevator Use:

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- 1. Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- **2.** Refer to Division 14 Sections for elevators.
- **G. Temporary Project Identification Signs:** Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.
  - 1. **Project Sign:** Engage an experienced sign painter to apply graphics. Comply with details to be furnished by the Construction Administrator.
    - a. Temporary Tripod Frame: For groundbreaking ceremonies only, provide a temporary tripod for the sign illustrated and described below. Make the tripod of 12 ft long 2" x 4"s (Stud Grade), beveled and bolted at the top. Provide approximately 5-ft between legs at grade. Provide a 6-ft long, 2" x 4" seat for the sign; locate 5-ft above grade and nail in place. Nail sign at four (4) places where edges intersect tripod legs. Drive a 24" long, pointed 2" x 4" stake into the earth next to each leg and nail to legs.
    - b. Project Sign: The Contractor shall contact the Construction Administrator for the proper wording for the project sign. Fabricate sign of 3/4" Exterior Grade A-B Fir plywood. Mount sign on preservative treated Fir posts. The Owner shall provide design, color selection and illustration of the Project Sign. Paint both sides and all edges of sign and the posts with two (2) coats of exterior, white, alkyd primer. Paint the border and letters with "bulletin" (sign) paint. Letter sizes, colors and related information are given on the illustration below. A self-adhesive decal of the State seal will be furnished at the Contract signing. Erect the sign within two (2) weeks after execution of the Contract and remove the sign within one (1) week after completion of the project.
    - a. Project Sign Detail: Sign letter sizes, fonts, colors and related information are shown in the illustration available for download from the DAS website (<a href="www.ct.gov/das">www.ct.gov/das</a>) > Doing Business With The State > State Building Construction > Publications and Forms > DAS Construction Services Library > 3000 Series Design Phase Forms.
- **H. Temporary Exterior Lighting:** Install exterior yard and sign lights so signs are visible when Work is being performed.
- I. Collection and Disposal of Waste and Cleaning:
  - 1. Collect waste within the contract limit line from construction areas daily. Provide separate containers for proper waste recycling. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80 degrees F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.
  - 2. Maintain areas under Contractor's control free of waste materials, debris and rubbish. Maintain in a clean and orderly condition.
  - **3.** Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces before closing the space.
  - Periodically clean interior areas before start of surface finishing and continue cleaning on an asneeded basis.
  - **5.** Control cleaning operations so that dust and other particulates will not adhere to wet or newly coated surfaces.
- J. Temporary Environmental Controls: Contractor is to provide the following controls.
  - 1. Rodent and Pest Control: Before deep foundation work has been completed, retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Employ this service to perform extermination and control procedures at regular intervals so the Project will be free of pests and their residues at materials.
  - 2. Dust Control (construction and demolition).
  - 3. Noise Control.

- 4. Erosion and Sediment Control.
- **5.** Pollution Control.
- Traffic Control.
- K. Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate. Cover finished permanent stairs with a protective covering of plywood or similar material so finishes will be undamaged at the time of acceptance.

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION (listed in Paragraph 1.2 D)

- **A.** Except for use of permanent fire protection as soon as available, do not change over from use of temporary security and protection facilities to permanent facilities until Substantial Completion, or longer, as requested by the Owner.
- B. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."
  - Provide and locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stairwell.
  - 2. Store combustible materials in containers in fire-safe locations.
  - **3.** Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
  - Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
  - 5. The Contractor, during construction, shall be responsible for loss or damage by fire to the work of the Contract until completion. Any fire used within the structure for working purposes shall be extinguished when not in use. Bitumen or tar shall be melted on the ground only. No flammable material shall be stored in the structure in excess of amounts allowed by the authorities. No gasoline shall be stored in or close to the building at any time. The Contractor shall assign a responsible employee to be in charge of fire protection measures.
  - 6. If an EPDM or other single-ply roof is included in the work that requires cleaning of mating surfaces of laps with gasoline, limit amount of gasoline on roof to two (2) gallons which shall be in UL listed containers. Also provide one 30 B:C fire extinguisher within 75 feet of any point on the roof.
- **C. Permanent Fire Protection:** At the earliest feasible date in each area of the Project, complete installation of the permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities.

# D. Security for Site and Agency:

- 1. Provide security program and facilities to protect work, existing facilities and the Owner and Agency's operations from unauthorized entry, vandalism and theft. Coordinate with the Owner's and Agency's security program.
- The Contractor shall be solely responsible for damage, loss or liability due to theft or vandalism.
- **E. Barricades, Warning Signs, and Lights:** Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.
  - Provide covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.
  - Provide temporary, insulated, weathertight closures at openings to the exterior to provide acceptable working conditions and protection for materials, to allow for temporary heating and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

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- 3. Barriers and enclosures shall be in conformance with code requirements. Do not block egress from occupied buildings unless necessary to further the work of the Contract. In this case, secure the Owners approval of an alternate egress plan.
- **4.** See also General Conditions Article 19, "Protection of the Work, Persons and Property".
- **F. Enclosure Fences:** Before excavation begins, install an enclosure fence with lockable entrance gates. Locate where indicated on the Construction Documents, or enclose the entire site or the portion determined sufficient to accommodate construction operations. Install in a manner that will prevent people, dogs, and other animals from easily entering the site, except by the entrance gates.
  - 1. Provide chain link construction fencing with posts set in a compacted mixture of gravel and earth. Use existing fence to the extent possible.
- G. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Provide keys to the Construction Administrator.
  - Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

### H. Protection:

- **1.** Protect buildings, equipment, furnishings, grounds and plantings from damage. Any damage shall be repaired or otherwise made good at no expense to the Owner.
- 2. Provide protective coverings and barricades to prevent damage. The Contractor shall be held responsible for, and must make good at his own expense, any water or other type of damage due to improper coverings. Protect the public and building personnel from injury.
- **3.** Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- 4. Provide protective coverings for walls, projections, jambs, sills and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects and storage. Prohibit traffic and storage on waterproofed and roofed surfaces and on lawn and landscaped areas.
- Provide temporary partitions and ceilings to separate work areas from Agency-occupied areas to prevent penetration of dust and moisture into Agency-occupied areas and equipment. Erect framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.
- **6.** See also General Conditions Article 19, "Protection of the Work, Persons and Property".
- Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result.

### J. Traffic Ways:

- The Contractor may use on-site paved roads and parking areas but shall not encumber same or their access. Public highways shall not be blocked by standing trucks, parked cars, material storage, construction operations or in any other manner.
- 2. Public roads and existing paved roads, drives and parking areas on Owner's property shall be kept free from scrap or debris due to construction operations and any damage to their surface caused by the Contractor shall be repaired by him at his own expense.
- 3. If the work of the Contract affects public use of any street, road, highway or thoroughfare, the Contractor shall confer with the police authority having jurisdiction to determine if and how many police are needed for public safety in addition to any barriers and signals that may be needed. The Contractor will be responsible for payment of any needed police services.
- 4. Access to Norwalk Community College Campus located 188 Richards Avenue, Norwalk, CT will not be used during time periods when the Daycare children are arriving and being dismissed. No access to the Theater Gate will be allowed:

Monday – Friday	7:30	a.m.	_	9:00	a.m.
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Monday – Friday 2:30	p.m.	-	3:30	p.m.
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This time period is subject to change at the discretion of the Construction Administrator to coincide with the **Campus/Day care** Schedule.

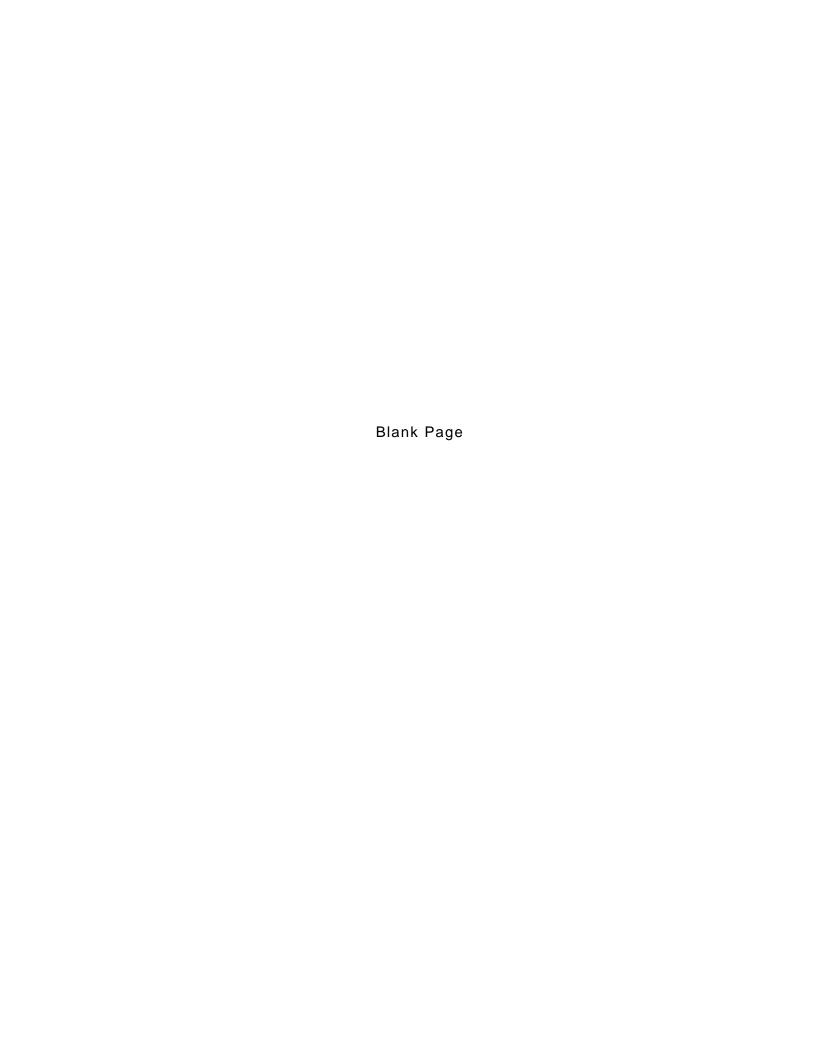
# K. Identification Badges for Contractor's Personnel, Visitors & Parking Stickers:

- The Contractor will provide each person working or visiting at the site with an identification badge, bearing the name of the Contractor and a number. As badges are assigned, a record shall be kept by the Contractor and given to the Construction Administrator and Agency Administrator. Update and correct the records of all badges issued on a semi-monthly basis.
- 2. Badges are to be worn on outer garment where visible at all times while at the construction site, return them to the Contractor's field office at the end of each day and pick them up there each morning.
- 3. All vehicles parking in the Contractor's parking lot and those used around the site require an ID sticker. They will be issued by the Agency. Each contractor shall apply for parking stickers through the Construction Administrator no more than semi-monthly and shall keep record of all stickers issued.

# 3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.
- **B. Maintenance:** Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.
  - Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
  - **2.** Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
- C. Termination and Removal: Unless the Architect/CA requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
  - 1. Materials and facilities that constitute temporary facilities are the Contractor's property. The Owner reserves the right to take possession of project identification signs.
  - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances, as required by the governing authority.
  - **3.** At Substantial Completion, clean and renovate permanent facilities used during the construction period including, but not limited to, the following:
    - a. Replace air filters and clean inside of ductwork and housings.
    - **b.** Replace significantly worn parts and parts subject to unusual operating conditions.
    - **c.** Replace lamps burned out or noticeably dimmed by hours of use.

# END OF SECTION 01 50 00



# **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS

A. Construction Documents and general provisions of the Contract, including General Conditions of the Contract for Construction and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Microbial and fungal contamination control.
  - 2. Indoor air quality and pollution control.
  - 3. Heating, ventilating, and air conditioning.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 57 40 "Construction IAQ Management Plan" for a description of the IAQ management plan.
  - 2. Division 01 Section 01 81 13 "Sustainable Design Requirements" for a description of the IAQ management plan.

### 1.3 REFERENCES

# A. Sheet Metal and Air Conditioning Contractors' National Association (SMACNA):

1. IAQ Guidelines For Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/ SMACNA 008-2008 (Chapter 3).

# PART 2 - PRODUCTS (Not Applicable)

### **PART 3 - EXECUTION**

# 3.1 MICROBIAL AND FUNGAL CONTAMINATION CONTROL

- A. Perform, schedule, and sequence Work as required to limit conditions supporting formations of microbes, molds, and fungi.
  - 1. Control water penetration, dampness, and humidity to prevent products not treated for exterior use from becoming soaked or damp.
  - **2.** Enclose building prior to installing interior materials and finishes.
  - **3.** Do not install interior products subject to moisture absorption until building is enclosed and wet work generating moisture and humidity is complete.
- **B.** When visible formations are observed and when formations cannot be completely removed by non-abrasive surface cleaning:
  - 1. Remove and replace materials identified as food sources for microbes, molds, and fungi.
  - 2. Correct conditions supporting microbial, mold, and fungal growth.
- **C.** Remove interior products and finishes, identified as food sources that have absorbed sufficient moisture to become damp whether or not microbial, mold, or fungal growth is observed. Include:
  - Gypsum board cores.
  - 2. Organic materials composed of cellulose fiber or paper.
  - 3. Materials containing sucrose or other binders identified as supporting microbial growth.
- **D.** Remove fibrous insulation materials subject to retaining moisture such as duct liner, insulation, and other materials that are made wet or damp and cannot immediately be made dry.
- **E.** Repair or replace ductwork, pans, and other conditions subject to moisture condensation, water penetration, or other water source not drained and made dry.
  - Remove conditions that have become an environment for microbes, molds, or fundi.

- 2. Do not permit conditions leading to standing water.
- **F.** Install wet work and allow time needed to dry and cure prior to installing materials such as carpet, acoustical material, textiles, and other material of type that may attract and retain moisture.

#### 3.2 INDOOR AIR QUALITY AND POLLUTION CONTROL

- A. Adhesives, Sealants, and Sealant Primers: For field applications that are inside the weatherproofing system, use adhesives, sealants, and sealant primers that comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168 effective July 1, 2005 and the rule amendment dated January 7, 2005.
  - 1. Aerosol Adhesives: Comply with the requirements of the Green Seal Standard for Commercial Adhesives GS-36 in effect on October 19, 2000.
- **B.** Paints and Coatings: For field applications that are inside the weatherproofing system, use paints and coatings that comply with the following limits for VOC content:
  - Architectural Paints, Coatings, and Primers Applied to Interior Walls and Ceilings: Do not exceed the VOC content limits established in Green Seal Standard GS-11, Paints, First Edition dated May 20, 1993:
    - a. Flats: 50 g/L.
    - b. Non-flats: 150 g/L.
  - Anti-corrosive and Anti-rust Paints Applied to Ferrous Metal Substrates: Do not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition dated January 7, 1997.
  - 3. Clear Wood Finishes, Floor Coatings, Stains, Sealers, and Shellacs Applied to Interior Elements: Do not exceed the VOC content limits established in the South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings in effect on January 1, 2004:
    - a. Clear Wood Finishes: Varnish not more than 350 g/L; Lacquer not more than 550 g/L.
    - b. Floor Coatings: VOC not more than 100 g/L.
    - Sealers: Waterproofing sealers not more than 250 g/L; Sanding sealers not more than 275 g/L; All other sealers not more than 200 g/L.
    - d. Shellacs, Clear: VOC not more than 730 g/L.
    - e. Shellacs, Pigmented: VOC not more than 550 g/L. f.

Stains: VOC not more than 250 g/L.

# C. Carpet Systems:

- 1. Carpet: Meet the requirements of the Carpet and Rug Institute's (CRI) Green Label Plus Program.
- 2. Carpet Cushion: Meet the requirements of CRI's Green Label Program.
- 3. Carpet Adhesive: VOC content of not more than 50 g/L.
- **D.** Composite Wood and Agrifiber Products: Do not use composite wood or agrifiber products or adhesives that contain added urea-formaldehyde resin.
- **E.** Do not use products in combination with or in contact with other products that can be identified as combining to form toxic fumes or sustained odors.
- **F.** Do not use solvents within interior areas that may penetrate and be retained in absorptive materials such as concrete, gypsum board, wood, cellulose products, fibrous material, and textiles.
- **G.** Protect construction materials from contamination and pollution from contact with construction dust, debris, fumes, solvents, and other environmentally polluting materials.
- **H.** Allow furnishings and materials such as carpet, floor tile, acoustical tile, textiles, office furniture, and casework, to air out in clean environment prior to installation.

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### 3.3 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

- **A.** Do not run permanent HVAC system during course of construction. Seal ductwork intake and exhaust vents.
- **B.** Heat, dehumidify, and ventilate building during course of Work as necessary to maintain environmental conditions suitable for drying and curing materials and for prevention of conditions suitable for mold and mildew growth.
  - 1. Ventilate building to remove moisture, dust, fumes, and odors.
  - 2. Temper and dehumidify air as needed to remove excess moisture.
  - 3. Do not use propane heaters and other moisture generating heating systems.
- **C.** Inspect ductwork for refuse, contaminants, moisture and other foreign contamination prior to commissioning. Notify Commissioning Agent (CxA) of satisfactory inspection prior to beginning of Commissioning.
- **D.** Clean underfloor plenum at access flooring acting as supply air duct, prior to occupancy.

# 3.4 REMEDIAL ACTION

- **A.** Promptly take action as necessary to inspect and remediate conditions suspected of supporting microbial, fungal or mold conditions and where contaminated by indoor air pollution.
- **B.** Notify and consult with Architect prior to beginning remedial action where contamination by hazardous chemicals, microbes, and fungi is suspected.

END OF SECTION 01 57 30

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### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to this section.

### 1.2 SUMMARY

- A. This Section includes:
  - 1. Description of a Construction Indoor Air Quality (IAQ) Management Plan.
  - 2. IAQ construction requirements.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Divisions 01 through 49 sections for green building rating system requirements specific to the Work of each of those sections. These requirements may or may not include reference to LEED.
  - 2. Division 01 Section 01 57 30 "Indoor Environmental Control."
  - 3. Division 01 Section 23 05 93 "Testing, Adjusting and Balancing for HVAC" for additional requirements for baseline testing for IAQ.
  - 4. Division 01 Section 23 05 93 "Testing, Adjusting and Balancing for HVAC" for cleaning of HVAC system including ductwork, air intakes and returns, and changing of filters.

### 1.3 REFERENCES

- A. American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE):
  - ANSI/ASHRAE 52.2-1999, "Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size", <u>www.ashrae.org</u>
- B. Sheet Metal and Air Conditioning National Contractors' National Association (SMACNA):
  - 1. "IAQ Guidelines for Occupied Buildings Under Construction", Second Edition, 2007, The Sheet Metal and Air Conditioner Contractors National Association (SMACNA). (703) 803-2980, www.smacna.org.

### 1.4 INDOOR AIR QUALITY

- A. Goals: The Owner has set the following indoor air quality goals for jobsite operations on the project, within the limits of the construction schedule, Contract Sum, and available materials, equipment, products and services. Goals include:
  - 1. Protect workers on the site from undue health risks during construction.
  - 2. Prevent residual problems with indoor air quality in the completed building.

#### 1.5 SUBMITTALS

- A. Indoor Air Quality Plan: Within fourteen (14) days after receipt of Notice of Award and prior to any waste removal from the project, develop and submit for review a healthy indoor air quality plan. The plan shall include:
  - 1. List of IAQ protective measures to be instituted on the site.
  - 2. Schedule for inspection and maintenance of IAQ measures.

Further description of the Construction IAQ Management Plan requirements is as follows:

SMACNA Guidelines: Chapter 3 of the referenced "IAQ Guidelines for Occupied Buildings Under Construction", outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format, and shall address measures to be implemented in each of the five categories (including subsections). All subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such.

#### **HVAC Protection**

- Return Side
- Central Filtration
- Supply Side
- Duct Cleaning

### Source Control

- Product Substitution
- Modifying Equipment Operation
- Changing Work Practices
- Local Exhaust
- Air Cleaning
- Cover or Seal

### Pathway Interruption

- Depressurize Work Area
- Pressurize Occupied Space
- Erect Barriers to Contain Construction Areas
- Relocate Pollutant Sources
- Temporarily Seal the Building

### Housekeeping

#### Schedulina

- Protect of Materials from Moisture Damage: As part of the "Housekeeping" section of the Construction IAQ
  Management Plan, measures to prevent installed materials or material stored on-site from moisture damage
  shall be described. This section should also describe measures to be taken if moisture damage does occur
  to absorptive materials during the course of construction.
- Replacement of Filtration Media: Under the "HVAC Protection" section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.
- Sequence of Finish Installation for Materials: Materials that off-gas toxic or potentially toxic fume shall be preconditioned for at least seventy-two hours prior to installation within the building. Where feasible, absorptive materials shall be installed after the installation of materials or finishes which have high short-term emissions of VOC's, formaldehyde, particulates, or other air-borne compounds. Absorptive materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the airstream); upholstered furnishings; and other woven, fibrous or porous materials. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.

Develop a separate sequencing plan that identifies feasible opportunities to meet the above-stated goals for the project. The plan shall be submitted to the Architect and Owner in accordance with the Submittal Requirements of Item 1.5 of this specification.

- A. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets shall be submitted with the Contactor's or Subcontractor's 'approved' stamp as confirmation that the products are the products installed on the project.
- B. Provide the Architect or Owner's Representative with a minimum of 18 photographs comprising of at least six photographs taken on three different occasions during construction. The photographs shall document the implementation of each of the measures followed in the Construction IAQ Management Plan throughout the course of the project construction. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs shall be submitted with brief descriptions of the Construction IAQ Management Plan measure documented, or be referenced to project meeting minutes or similar project documents which reference to the Construction IAQ Management Plan measure documented.

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#### **QUALITY ASSURANCE** .1.6

A. During construction, meet or exceed the recommended control measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines For Occupied Buildings Under Construction, 2nd Edition 2007, ANSI/ SMACNA 008-2008 (Chapter 3).

### **PART 2 - PRODUCTS**

#### 2.1 **SUBSTITUTIONS**

A. Should the Contractor desire to use procedures, materials, equipment, or products that are not specified but meet the intent of the specifications to protect indoor air quality on the site, the Contractor shall propose these substitutions in accordance with Section 01 60 00 "Product Requirements."

#### 2.2 **MATERIALS**

A. Low emitting products have been specified in appropriate sections.

### **PART 3 - EXECUTION**

#### 3.1 CONSTRUCTION IAQ MANAGEMENT PLAN - IMPLEMENTATION AND COORDINATION

- Implement the Construction IAQ Management Plan, and coordinate the Plan with all affected trades. Designate one individual as the Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the Owner and Consultant on a regular basis, and for assembling the required LEED documentation. The Contractor shall include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not conform to the Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.
- В. Subcontractors shall be responsible for the implementation of specific control measures, as specified in the Construction IAQ Management Plan. Subcontractors shall coordinate their responsibilities through the Construction Manager and their designated Construction IAQ Representative.
- C. Prepare and submit a Construction IAQ Management Plan to the Owner for approval. The Construction IAQ Management Plan shall meet the following criteria:
  - 1. Absorptive materials shall be protected from moisture damage when stored on-site and after installation.
  - 2. If air handlers are to be used during construction, filtration with a Minimum Efficiency Reporting Value (MERV) of 8 must be at each return air grill, as determined by ASHRAE 52.2-1999.
  - 3. Filtration media shall be replaced immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999.
  - 4. Materials that off-gas toxic or potentially toxic fume shall be pre-conditioned for at least seventy-two hours prior to installation within the building. A "Sequence of Finish Installation Plan" shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as "sinks".

Upon approval of the Plan by the Owner and Architect, it shall be implemented through the duration of the construction process, and documented in accordance with the Submittal Requirements 1.5 above.

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### 3.2. Construction Indoor Air Quality (IAQ) Management Plan (Before Occupancy) Credit:

- A. Meet or exceed the minimum requirements of the SMACNA "IAQ Guidelines for Occupied Buildings Under Construction."
- Protect the ventilation system components from contamination, OR provide cleaning of the ventilation components exposed to contamination during construction prior to occupancy.
- 2. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total air volume of 14000 cu ft of outdoor air per sq ft of floor area while maintaining an internal temperature of at least 60 degrees F and relative humidity no higher than 60 percent.
- 3. If building occupancy is to occur before completion of the flush-out, deliver a minimum of 3500 cu ft of outdoor air per sq ft of floor area to the space. Once the space is occupied, ventilate it at a minimum rate of 0.30 cfm/sq ft of outside air or the design minimum outside air rate determined in accordance with Sections 4 through 7 of ASHRAE 62.1 or applicable local code, whichever is more stringent. During each day of the flush-out period, begin ventilation a minimum of three (3) hours prior to occupancy and continue during occupancy. Maintain these conditions until a total of 14000 cu ft/sq ft of outside air has been delivered to the space.
- B. During installation of carpet, paints, furnishings, and other VOC-emitting products, provide supplemental (spot) ventilation for at least 72 hours after work is completed. Preferred HVAC system operation uses supply air fans and ducts only; exhaust provided through windows. Use exhaust fans to pull exhaust air from deep interior locations. Stair towers and other paths to exterior can be useful during this process.
- C. Conduct regular inspection and maintenance of indoor air quality measures including ventilation system protection, and ventilation rate.
- D. Require VOC-safe masks for workers installing VOC-emitting products (interior and exterior) defined as products that emit 150 gpl or more UNLESS local jurisdiction's requirements are stricter, in which case the strictest requirements shall be followed for use of VOC-safe masks.
- E. Use low-toxic cleaning supplies for surfaces, equipment, and worker's personal use. Options include several soybean-based solvents and cleaning options (SoySolv) and citrus-based cleaners.
- F. Use wet sanding for gypsum board assemblies. Exception: Dry sanding allowed subject to Architect's approval of the following measures:
  - Full isolation of space undergoing finishing.
  - 2. Plastic protection sheeting is installed to provide air sealing during sanding.
  - 3. Closure of all air system devices and ductwork.
  - 4. Sequencing of construction precludes the possibility of contamination of other spaces with gypsum dust.
  - 5. Worker protection is provided.
- G. Use safety meetings, signage, and Contractor agreements to communicate the goals of the construction indoor air quality plan.

**END OF SECTION 01 57 40** 

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**SECTION 01 59 39** 

TEMPORARY TREE AND PLANT PROTECTION

PART 1- GENERAL

# 1.1. RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

# 1.2. SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Sections:
  - 1. Division 01 Section "Temporary Facilities and Controls" for temporary site fencing.
  - 2. Division 31 Section "Clearing and Grubbing" for removing existing trees and shrubs.

# 1.3. DEFINITIONS

- A. Caliper: Diameter of a trunk measured by the average of the smallest and largest diameters] at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100-mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- C. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings.
- D. Exploratory-Excavation Zone: Areas located around individual trees and or groups of trees where pneumatic or hand excavation is required to reveal plant / tree root systems.
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

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# 1.4. SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Verification: For each type of the following:
  - 1. Organic Mulch: 1-quart (1-L) volume of organic mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.
  - 2. Protection-Zone Fencing: Assembled Samples of manufacturer's standard size made from full-size components.
  - 3. Protection-Zone Signage: Full-size Samples of each size and text, ready for installation.
- C. Tree Pruning Schedule: Written schedule detailing scope and extent of pruning of trees to remain that interfere with or are affected by construction.
  - 1. Species and size of tree.
  - 2. Location on site plan. Include unique identifier for each.
  - 3. Reason for pruning or reason for inaction.
  - 4. Description of pruning to be performed.
  - 5. Description of maintenance following pruning.
- D. Qualification Data: For qualified arborist and tree service firm.
- E. Certification: From arborist, certifying that trees indicated to remain have been protected during construction according to recognized standards and that trees were promptly and properly treated and repaired when damaged.
- F. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing the Work.
- G. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.

# 1.5. QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by ISA.
- 3. Tree Service Firm Qualifications: An experienced tree service firm that has successfully completed temporary tree and plant protection work similar to that required for this Project and that will assign an experienced, qualified arborist to Project site during execution of the Work.

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- C. Preinstallation Conference: Conduct conference at Project site.
  - 1. Review methods and procedures related to temporary tree and plant protection including, but not limited to, the following:
    - 1.5.C.1.1. Construction schedule. Verify availability of materials, personnel, and equipment needed to make progress and avoid delays.
    - 1.5.C.1.2. Enforcing requirements for protection zones.
    - 1.5.C.1.3. Arborist's responsibilities.
    - 1.5.C.1.4. Field quality control.

# 1.6. PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

# PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Topsoil: Natural or cultivated top layer of the soil profile or manufactured topsoil; complying with topsoil definition in 329200 Turf and Grasses.
- B. Organic Mulch: Free from deleterious materials and suitable as a top dressing for trees and shrubs, consisting of one of the following:
  - 1. Type: Wood and bark chips.
  - 2. Size Range: 3 inches (76 mm) maximum, 1/2 inch (13 mm) minimum.
  - 3. Color: Natural.
- C. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements. Previously used materials may be used when approved by Architect.
  - 1. Chain-Link Protection-Zone Fencing: Galvanized-steel fencing fabricated from minimum 2-inch (50-mm) opening, 0.148-inch- (3.76-mm-) diameter wire chain-link fabric; with pipe posts, minimum 2-3/8-inch- (60-mm-) OD line

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posts, and 2-7/8-inch- (73-mm-) OD corner and pull posts and 0.177-inch- (4.5-mm-) diameter bottom tension wire; with tie wires, hog ring ties, and other accessories for a complete fence system.

- 1.1.C.1.1. Height: 5 feet (1.5 m).
- 2. Plywood Protection-Zone Fencing: Plywood framed with four 2-by-4-inch (50-by-100-mm) rails, with [4-by-4-inch (100-by-100-mm)] <Insert dimensions> preservative-treated wood posts spaced not more than 8 feet (2.4 m) apart.
  - 1.1.C.2.1. Height: [4 feet (1.2 m)] [6 feet (1.8 m)] < Insert dimension>.
  - 1.1.C.2.2. Plywood and Lumber: Comply with requirements in Division 06 Section "[Rough Carpentry] [Miscellaneous Rough Carpentry]."
- 3. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 1inch (25-mm) by 2-inch (50-mm) maximum opening in pattern and weighing a minimum of 0.4 lb/ft. (0.6 kg/m); remaining flexible from minus 60 to plus 200 deg F (minus 16 to plus 93 deg C); inert to most chemicals and acids; minimum tensile yield strength of 2000 psi (13.8 MPa) and ultimate tensile strength of 2680 psi (18.5 MPa); secured firmly with steel rebar ties at the top, middle and bottom; and supported by 2"x2"x6' hardwood stakes spaced not more than 8 feet (2.4 m) apart.
- 4. Height: [4 feet (1.2 m)].
- 5. Color: High-visibility, International Orange, nonfading.
- 6. Gates: Double swing access gates matching material and appearance of fencing, to allow for maintenance activities within protection zones; leaf width 36 inches (914 mm).
- D. Protection-Zone Signage: Shop-fabricated, rigid plastic or metal sheet with attachment holes prepunched and reinforced; legibly printed with nonfading lettering and as follows:
  - 1. Size and Text:
    - 1.1.D.1.1. NO ENTRY

# TREE PROTECTION AREA

Please notify Project Arborist of individuals in violation of this notice.

2. Lettering: 3-inch- (75-mm-) high minimum, black characters on white background.

# PART 3 - EXECUTION

# 3.1 EXAMINATION

A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

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- B. For the record, prepare written report, endorsed by arborist, listing conditions detrimental to tree and plant protection.
- C. Prior to Tree Protection Installation, Project Arborist, Construction Manager and General Contractor to walk site and notify Landscape Architect, Architect and/or Owner's representative of any conflicts resulting from site conditions not apparent in Construction Documentation. Any conflict detected will require resolution prior to proceeding with Tree Protection Installation. Should conflict go undetected during inspection, it will be the responsibility of the General Contractor to provide restitution means as outlined in this specification as conflicts arise during the construction process. See section 3.09 Repair and Replacement this specification.

# 3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated. Flag or Tie a 1-inch (25-mm) blue-vinyl tape around each tree trunk at 54 inches (1372 mm) above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.
- C. Tree-Protection Zones: Mulch areas inside tree-protection zones and other areas indicated.
  - 1. Apply 4-inch average thickness of organic mulch. Do not place mulch within 6 inches (150 mm) of tree trunks.

# 3.3 TREE- AND PLANT-PROTECTION ZONES

- 1. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people and animals from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.
- 1. Chain-Link Fencing: Install to comply with ASTM F 567 and with manufacturer's written instructions.
- Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Architect.

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- 3. Access Gates: Install where indicated; adjust to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.
- 2. Protection-Zone Signage: Install protection-zone signage in visibly prominent locations in a manner approved by Architect. Install one sign spaced approximately every 35 feet (10.5 m) on protection-zone fencing, but no fewer than four signs with each facing a different direction.
- 1. Maintain protection zones free of weeds and trash.
- 2. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
- 3. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.
- 4. Do not remove protection-zone fencing, even temporarily, to allow deliveries or equipment access through the protection zone.
- 5. Temporary access is permitted subject to preapproval in writing by arborist if a root buffer effective against soil compaction is constructed as directed by arborist. Maintain root buffer so long as access is permitted.

# 3.4 EXCAVATION

- A. General: Excavate at edge of protection zones and for trenches indicated within protection zones according to requirements in Division 31 Section "Earth Moving."
- B. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- C. Redirect roots in backfill areas where possible. If encountering large, main lateral roots, expose roots beyond excavation limits as required to bend and redirect them without breaking. If encountered immediately adjacent to location of new construction and redirection is not practical, cut roots approximately 3 inches (75 mm) back from new construction and as required for root pruning.
- D. Do not allow exposed roots to dry out before placing permanent backfill. Provide temporary earth cover or pack with peat moss and wrap with burlap. Water and

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maintain in a moist condition. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.

# 3.5 EXPLORATORY EXCAVATION

- A. General: Excavation within these zones will be limited to low impact methods of excavation approved by Landscape Architect such as hand excavation and pneumatic excavation to a depth if 18".
  - 1. Hand Excavation: Shovel, pick, hoe, wheelbarrow
- 2. Pneumatic Excavation: Air Spade, Air Compressor, Vacuum Truck, Containment Structure
  - B. See this spec sect "3.04 Excavation" for notes regarding treatment of encountered tree roots.

# 3.6 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
  - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
  - 2. Cut Ends: Do not paint cut root ends.
  - 3. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.
  - 4. Cover exposed roots with burlap and water regularly.
  - 5. Backfill as soon as possible according to requirements in Division 31 Section "Earth Moving."
- B. Root Pruning at Edge of Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
- C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

# 3.7 CROWN PRUNING

A. Prune branches that are affected by temporary and permanent construction. Prune branches under the supervision of a certified arborist

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- Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
- 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
  - a. Type of Pruning: Cleaning, Thinning, Raising and Reduction.
- 3. Cut branches with sharp pruning instruments; do not break or chop.
- 4. Do not apply pruning paint to wounds.
- B. Chip removed branches and stockpile in areas approved by Architect.

# 3.8 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Lowering Grade within Protection Zone: Where new finish grade is indicated below existing grade around trees, slope grade away from trees as recommended by arborist unless otherwise indicated.
  - 1. Root Pruning: Prune tree roots exposed by lowering the grade. Do not cut main lateral roots or taproots; cut only smaller roots. Cut roots as required for root pruning.
- C. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- D. Minor Fill within Protection Zone: Where existing grade is 2 inches (50 mm) or less below elevation of finish grade, fill with topsoil. Place topsoil in a single uncompacted layer and hand grade to required finish elevations.

# 3.9 FIELD QUALITY CONTROL

A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

# 3.10 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
  - 1. Submit details of proposed root cutting and tree and shrub repairs.

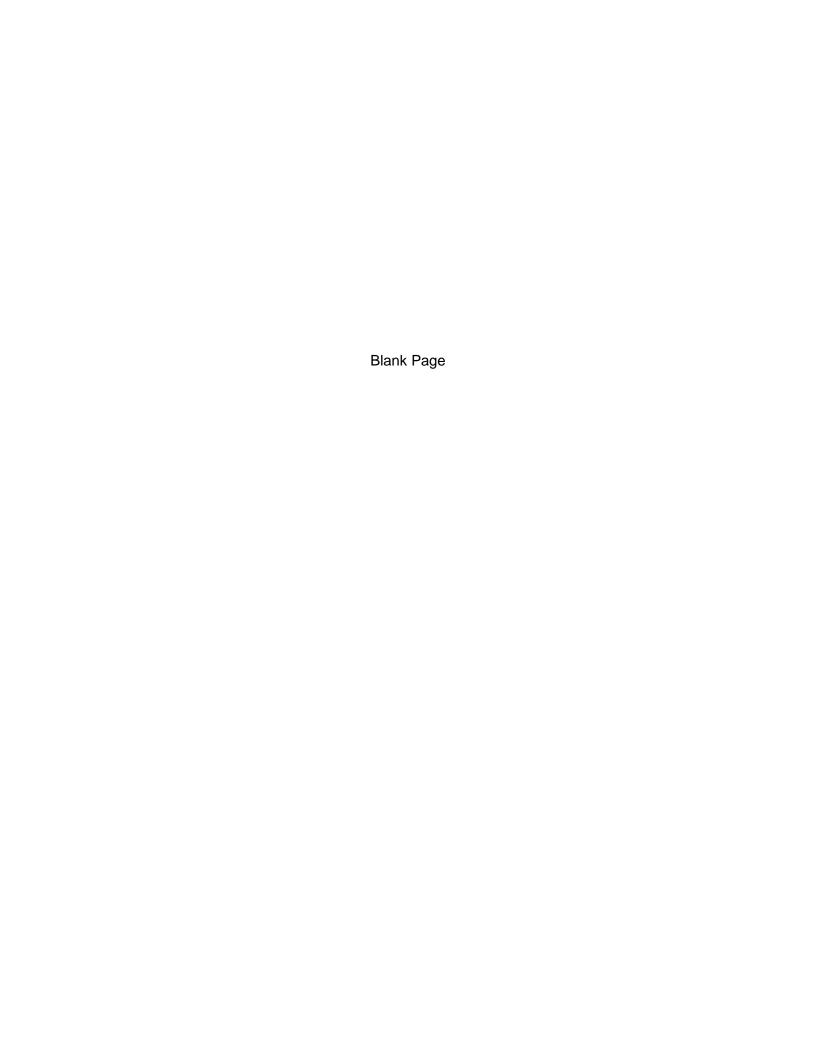
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- 2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
- 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
- 4. Perform repairs within 24 hours.
- 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Trees: Remove and replace trees indicated to remain that are more than 50 percent dead or in an unhealthy condition before the end of the corrections period or are damaged during construction operations that Architect and Certified Arborist determine are incapable of restoring to normal growth pattern.
  - 1. Provide two new trees of 4-inch (100-mm) caliper size for each tree being replaced that measures more than 4 inches (100 mm) in caliper size.
    - a. Species: Species selected by Architect.
    - 2. Plant and maintain new trees as specified in Division 32 Section "Plants."
- C. Soil Aeration: Where directed by Architect, aerate surface soil compacted during construction. Aerate [0 feet (3 m) beyond drip line and no closer than 36 inches (900 mm) to tree trunk. Drill 2-inch- (50-mm-) diameter holes a minimum of 12 inches (300 mm) deep at 24 inches (600 mm) o.c. Backfill holes with an equal mix of augered soil and sand.

# 3.11 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 015639



#### 1.1 **RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - Division 01 Section 01 25 00 "Substitution Procedures" specifies administrative procedures for handling requests for substitutions made after award of the Contract.
  - Division 01 Section 01 33 00 "Submittal Procedures" specifies requirements for submittal of the Contractor's Construction Schedule and the Submittal Schedule.
  - Division 01 Section 01 42 20 "Reference Standards and Definitions" specifies the applicability of industry standards to products specified.

#### 1.3 **DEFINITIONS**

- A. Definitions used in this Article are not intended to change the meaning of other terms used in the Contract Documents, such as "specialties," "systems," "structure," "finishes," "accessories," and similar terms. Such terms are self-explanatory and have well-recognized meanings in the construction industry.
  - "Products" are items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
    - "Named Products" are items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, which is current as of the date of the Contract Documents.
  - "Materials" are products substantially shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
  - "Equipment" is a product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

#### 1.4 **QUALITY ASSURANCE**

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
- B. Compatibility of Options: When the Contractor is given the option of selecting between two (2) or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.
- C. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
  - 1. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
  - Equipment Nameplates: Provide a permanent nameplate on each item of service-connected or poweroperated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces. The nameplate shall contain the following information and other essential operating data:
    - Name of product and manufacturer.
    - b. Model and serial number.
    - Capacity.
    - d. Speed.

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e. Ratings.

#### 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products according to the manufacturer's recommendations, using means and methods that will prevent damage, deterioration, and loss, including theft.
  - Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.
  - Coordinate delivery with installation time to assure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  - Deliver products to the site in an undamaged condition in the manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Store products in accordance with manufacturers' instructions and maintain within temperature and humidity range required by manufacturer.
  - Inspect products upon delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
  - Store products at the site in a manner that will facilitate inspection and measurement of quantity or counting of units.
  - Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.
  - Store products subject to damage by the elements above ground, under cover in a weathertight enclosure, with ventilation adequate to prevent condensation.
  - For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
  - Store loose granular material on solid surfaces in a well-drained area; prevent mixing with foreign matter.
  - 10. Arrange storage to provide access for inspection. Periodically inspect to insure products are undamaged and are maintained under required conditions. Keep log showing date, time and problems, if any.
  - 11. Stone, masonry units and similar materials shall be stored on platforms or dry skids and shall be adequately covered and protected against damage.
  - 12. Materials and equipment shall be delivered, stored and handled to prevent intrusion of foreign matter and damage by weather or breakage. Packaged materials shall be delivered and stored in original, unbroken packages.
  - 13. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct and products are undamaged.
  - 14. Packages, materials and equipment showing evidence of damage will be rejected and replaced at no additional cost to the Owner.

# **PART 2 - PRODUCTS**

#### PRODUCT SELECTION 2.1

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.
  - Provide products complete with accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and the intended use and effect.
  - Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
- B. Product Selection Procedures: The Contract Documents and governing regulations govern product selection. Procedures governing product selection include the following:
  - Semi-proprietary Specification Requirements: Where Specifications name two (2) or more products or manufacturers, provide one (1) of the products indicated. Comply with the requirements of Division 01 Section 01 25 00 "Substitution Procedures."

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- 2. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.
- Compliance with Standards, Codes, and Regulations: Where Specifications only require compliance with an imposed code, standard, or regulation, select a product that complies with the standards, codes, or regulations specified.
- 4. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern, and texture from the product line selected.

# **PART 3 - EXECUTION**

# 3.1 INSTALLATION OF PRODUCTS

- **A.** Comply with manufacturer's instructions and recommendations for installation of products in the applications indicated. Anchor each product securely in place, accurately located and aligned with other Work.
  - 1. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01 60 00

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## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- **A. General:** This Section specifies administrative and procedural requirements for field engineering services including, but not limited to, the following:
  - 1. Land survey work.
  - 2. Civil Engineering services.
  - 3. Damage surveys.
  - 4. Geotechnical monitoring.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
  - 2. Division 01 Section 01 33 00 "Submittal Procedures" for submitting Project record surveys.
  - 3. Division 01 Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents and recording of Owner-accepted deviations from indicated lines and levels.

### 1.3 SUBMITTALS

- A. Certificates: Submit a certificate from the Land Surveyor stating that the control information furnished by the Owner is accurate or identify inaccuracies, if they exist. The Contractor shall not take advantage of errors, which may be included in the control information. Stakes and markings shall be preserved.
- B. Final Property Survey: Prepare and submit 10 copies of the final property survey.
- C. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of "Submittals" and "Project Closeout" Sections.

# 1.4 QUALITY ASSURANCE

- A. Provide field engineering services to establish and record grades, lines and elevations.
- **B.** The Contractor shall retain a Land Surveyor registered by the State of Connecticut to confirm State furnished base lines and benchmarks, lay out the building, underground utility lines and other site work from the information furnished by the Owner and to establish and record the necessary elevations, at no additional cost to the State.

# PART 2 - PRODUCTS (Not Applicable)

# **PART 3 - EXECUTION**

### 3.1 EXAMINATION

- A. Identification: The Owner will identify two (2) base lines on the Contract Drawings.
- **B.** Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks. Notify the Construction Administrator of any discrepancies immediately in writing before proceeding to lay out the Work. Locate and protect existing benchmarks and base line. Preserve permanent reference points during construction.
  - 1. Do not change or relocate benchmarks or base line without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grades or locations.

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- Promptly replace lost or destroyed Project baseline benchmarks. Base replacements on the original survey control points.
- **C.** Establish and maintain a sufficient quantity of (minimum of 2) permanent benchmarks on the site, referenced to data established by Owner supplied information.
  - Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- **D.** Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.
  - Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping. Notify the Construction Administrator of any discrepancies prior to proceeding.

### 3.2 PERFORMANCE

- A. Work from lines and levels established by the property survey. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
  - 1. Advise entities engaged in construction activities of benchmarks and control points for their use.
  - As construction proceeds, check every major element for line, level, and plumb.
- **B.** Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.
  - Record deviations from required lines and levels and advise the Construction Administrator when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
  - On completion of foundation walls, major site improvements, underground utilities, and other Work
    requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles,
    elevations of construction, as-built locations and site work.
- **C. Site Improvements:** Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes, and invert elevations.
- **D. Building Lines and Levels:** Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels, and control lines and levels required for mechanical and electrical work.
- **E. Existing Utilities:** Furnish information necessary to adjust, move, or relocate existing structures, utility poles, lines, services, or other appurtenances located in or affected by construction. Coordinate with local authorities having jurisdiction.
- **F. Final Property Survey:** Prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the surveyor, that principal metes, bounds, lines, and levels of the Project are accurately positioned as shown on the survey.

END OF SECTION 01 71 23

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## 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

# 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for cutting and patching.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 31 00 "Project Management and Coordination" for procedures for coordinating cutting and patching with other construction activities.
  - 2. Division 01 Section 01 35 16 "Alteration Project Procedures" for procedures for coordinating cutting and patching with other construction activities.
  - 3. Division 02 Section "Selective Demolition and Alteration Work" for demolition and deconstruction of selected portions of the building for alterations.
  - Division 02 Section "Selective Site Demolition" for demolition and deconstruction of selected portions of the site for alterations.
  - Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
    - a. Requirements of this Section apply to mechanical and electrical installations. Refer to Division 22, 23, and 26 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

## 1.3 SUBMITTALS

- **A.** Cutting and Patching Proposal: Submit a proposal to the Construction Administrator describing procedures well in advance of the time cutting and patching will be performed and if the Owner's Representative and/or Architect/Engineer requires approval of these procedures before proceeding. Request approval to proceed. Include the following information, as applicable, in the proposal:
  - Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
  - Describe anticipated results in terms of changes to existing construction. Include changes to structural
    elements and operating components as well as changes in the building's appearance and other significant
    visual elements.
  - 3. Describe affects to integrity of weather exposed or moisture resistant element.
  - 4. Describe affects to efficiency, maintenance, or safety of any operational element.
  - **5.** Describe affects to Work of Owner or separate contractor.
  - **6.** List products to be used and firms or entities that will perform Work.
  - 7. Indicate dates when cutting and patching will be performed.
  - 8. **Utilities:** List utilities that cutting and patching procedures will disturb or affect. List utilities that will be relocated and those that will be temporarily out of service. Indicate how long service will be disrupted.
  - **9.** Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations sealed by an Engineer registered in the State of Connecticut showing integration of reinforcement with the original structure.
  - 10. Approval by the Construction Administrator to proceed with cutting and patching does not waive the Architect/Engineer of Record's rights to later require complete removal and replacement of unsatisfactory Work.

## 1.4 QUALITY ASSURANCE

**A.** Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

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- 1. Obtain approval from the Architect/Engineer of the cutting and patching proposal before cutting and patching the following structural elements:
  - a. Foundation construction.
  - b. Bearing and retaining walls.
  - c. Structural concrete.
  - d. Structural steel.
  - e. Lintels.
  - f. Structural decking.
  - g. Miscellaneous structural metals.
  - h. Exterior curtain-wall construction.
  - i. Equipment supports.
  - j. Piping, ductwork, vessels, and equipment.
  - k. Structural systems of special construction in Division 13 Sections.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety.
  - 1. Obtain Architect/Engineer's approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
    - a. Primary operational systems and equipment.
    - b. Air or smoke barriers.
    - c. Water, moisture, or vapor barriers.
    - d. Membranes and flashings.
    - e. Fire protection systems.
    - f. Noise and vibration control elements and systems.
    - g. Control systems.
    - h. Communication systems.
    - i. Conveying systems.
    - j. Electrical wiring systems.
    - k. Operating systems of special construction in Division 13 Sections.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner.

# 1.5 WARRANTY

**A. Existing Warranties:** Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

# **PART 2 - PRODUCTS**

# 2.1 MATERIALS, GENERAL

- A. Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used. Use materials whose installed performance will equal or surpass that of existing materials.
- B. The Contractor shall install sleeves, inserts and hangers furnished by the trades needing same.

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## **PART 3 - EXECUTION**

## 3.1 INSPECTION

- **A.** Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, notify the Construction Administrator and Architect, before proceeding with corrective action.
- **B.** Openings and chases may not be shown on the Drawings. It is the responsibility of the Contractor to examine the Architectural, Electrical, Heating, Cooling, Ventilating and Plumbing Drawings and to provide chases, channels or openings where needed.
  - After installing Work into openings, channels and/or chases, the Contractor shall close same. If finishes
    are to be restored, the new Work shall match the original and shall be done by the trade customarily
    responsible for the particular kind of Work.
- C. The Contractor shall verify dimensions for built-in Work and/or Work adjoining that of other trades before ordering any material or doing any Work. Discrepancies shall be submitted to the Construction Administrator before proceeding with the Work.
- D. See also General Conditions Article 23 "Cutting, Fitting, Patching & Digging".

### 3.2 PREPARATION

- **A.** Temporary Support: Provide temporary support of Work to be cut.
- **B.** Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Work that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- **D.** Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

### 3.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
  - Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
  - 2. DO perform cutting and patching to integrate elements of Work. Provide penetrations of existing surfaces. Provide samples for testing. Seal penetrations through floors, walls, ceilings and roofs, as applicable; restore or preserve fire-rated and smoke-barrier construction. Construction and finishes shall match original Work.
- **B. Cutting:** Cut existing construction using methods least likely to damage elements retained or adjoining construction. Where possible, review proposed procedures with the original Installer; comply with the original Installer's recommendations.
  - In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering
    and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum
    disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
  - Cut through concrete and masonry using a cutting machine, such as a Carborundum saw or a diamondcore drill.
  - Comply with requirements of applicable Division 32 Sections where cutting and patching requires excavating and backfilling.
  - 5. Where services are required to be removed, relocated, or abandoned, by-pass utility services, such as pipe or conduit, before cutting. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.
- **C. Patching:** Patch with durable seams that are as invisible as possible. Comply with specified tolerances.

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- 1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
- 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
- 3. Where removing walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - **a.** Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing the patch after the area has received primer and second coat.
- **4.** Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.

## 3.4 CLEANING

**A.** Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

END OF SECTION 01 73 29

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## 1.1 RELATED DOCUMENTS

- **A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- 1. All sections of the Specifications involving demolition or construction activities.

### 1.2 SUMMARY

- **A.** This Section includes requirements for waste management goals, waste management plan and waste management plan implementation.
- **B.** Related Sections: The following Sections contain requirements that relate to this Section:
  - Division 01 Section 01 11 00 "Summary of Work".
  - 2. Division 01 Section 01 20 00 "Price and Payment Procedures".
  - 3. Division 01 Section 01 25 00 "Substitution Procedures".
  - 4. Division 01 Section 01 31 19 "Project Meetings".
  - 5. Division 01 Section 01 33 00 "Submittal Procedures".
  - 6. Division 01 Section 01 45 00 "Quality Control".
  - 7. Division 01 Section 01 50 00 "Temporary Facilities and Controls".
  - 8. Division 01 Section 01 60 00 "Product Requirements".
  - 9. Division 01 Section 01 77 00 "Closeout Procedures".
  - 10. Division 01 Section 01 81 13 "Sustainable Design Requirements".

## 1.3 DEFINITIONS

- **A. Construction Waste:** Solid wastes such as building materials, packaging and rubble resulting from construction, paving and infrastructure.
- **B. Demolition Waste:** Solid wastes such as concrete, wood, brick, plaster, roofing materials, wallboard, metals, carpeting, insulation, and clean fill resulting from demolition or selective demolition of structures.
- **C. Recyclable Materials:** Products and materials that can be recovered and remanufactured into a new product. Recyclable materials include, but are not limited to, the following:
  - 1. Metals (ferrous and non-ferrous), including banding, metal studs, ductwork, and piping.
  - 2. Asphaltic concrete paving.
  - 3. Portland cement concrete.
  - Gypsum products.
  - **5.** Paper and cardboard.
  - 6. Wood products, including structural, finish, crates, and pallets.
  - **7.** Brick and masonry.
  - 8. Carpet and padding.
  - 9. Plastics.
  - 10. Copper wiring.
- **D. Recycling Facility:** A business that specializes in collecting, handling, processing, distributing, or remanufacturing waste materials generated by new construction projects, into products or materials that can be used for this project or by others.
- E. Salvage and Reuse: Existing usable product or material that can be saved and reused in some manner on the project site. Materials for reuse must be approved by the Architect. Materials that can be salvaged and reused must comply with applicable technical specifications and include, but are not limited to, the following:
  - 1. Dimensional lumber and other wood products.
  - 2. Structural steel.

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- 3. Soil.
- 4. Masonry products.
- 5. Plants.
- **F. Salvage for Resale:** Existing usable product that can be saved and removed intact (as is) from the project site to another site for resale to others without remanufacturing.

# 1.4 WASTE MANAGEMENT GOALS

- **A.** The Owner has established that this Project shall generate the least amount of waste possible and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
- **B.** The Contractor shall use all means available to divert the greatest extent practical and economically feasible, construction waste from landfills and incinerators.
- **C.** Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.
- **D.** Recycle and/or salvage a minimum of 75 percent of non-hazardous construction and demolition waste by weight of the total solid waste generated by the Project.
- **E.** With regard to these goals the Contractor shall develop, for the Architect's review, a Waste Management Plan for this Project.
- **F.** Take a pro-active, responsible role in management of construction waste and require all subcontractors, vendors, and suppliers to participate in the effort. Establish a construction waste management program that includes the following categories:
  - 1. Minimizing packaging waste.
  - 2. Salvage and reuse.
  - 3. Salvage for resale or donation.
  - Recycling.
  - 5. Disposal.

# 1.5 SUBMITTALS

- A. Draft Waste Management Plan: Within 30 days after receipt of Notice of Award of Bid, or prior to any waste removal, whichever occurs sooner, the Contractor shall submit three (3)copies of a Draft Waste Management Plan to the Construction Administrator.
- **B.** Final Waste Management Plan: Once the Owner has determined which of the recycling options addressed in the Draft Waste Management Plan are acceptable, the Contractor shall submit within 10 days three (3) copies of a Final Waste Management Plan.
- **C. Progress Reports:** Submit three (3) copies of monthly progress reports, at the same time as the Application for Payment, documenting the following:
  - Material category.
  - 2. Point of waste generation.
  - 3. Total quantity of waste in tons.
  - 4. Quantity of waste salvaged, in tons.
  - **5.** Quantity of waste recycled, in tons.
  - **6.** Total quantity of waste recovered (salvaged plus recycled) in tons.
  - **7.** Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- **D. Calculations:** Submit three (3) copies of calculations indicating the end-of-project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Project prior to Substantial Completion.

# E. Record Submittals:

1. **Donations:** Indicate which salvageable materials were donated, who they were donated to, and whether the recipient is tax exempt. Submit documentation indicating receipt of donations.

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- 2. Sales: Indicate which salvageable materials were sold, who they were sold to, and whether the recipient is tax exempt. Submit documentation indicating receipt of materials.
- **3. Recycling:** Indicate which materials were recycled and the name of the facility licensed to accept them. Submit documentation such as manifests, weight tickets, receipts, and invoices.
- **4. Waste Disposal:** Indicate which materials were accepted as waste by landfills and incinerator facilities licensed to accept them. Submit documentation indicating receipt of materials.

## 1.6 QUALITY ASSURANCE

- **A. Regulatory Requirements:** Comply with regulations of State of Connecticut Department of Environment Protection, Waste Management Bureau Recycling Program.
- B. Waste Management Conference: Review and discuss the waste management plan, requirements for documenting quantities of each type of waste and its disposition, procedures for materials separation, procedures for periodic collection and transportation to recycling and disposal facilities. Review waste management requirements for each trade. Verify availability of containers and bins needed to avoid delays.

# 1.7 WASTE MANAGEMENT PLAN

- A. Draft Waste Management Plan: Include the following in the Draft Plan:
  - 1. Analysis of the proposed jobsite waste to be generated, including types and quantities.
  - 2. Landfill Options: The name of the landfill(s) where trash will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all Project waste in the landfill(s).
  - 3. Alternatives to Landfilling: A list of each material proposed to be salvaged, reused, or recycled during the course of the Project, the proposed local market for each material, and the estimated net cost savings or additional costs resulting from separating and recycling (versus landfilling) each material. "Net" means that the following have been subtracted from the cost of separating and recycling:
    - a. Revenue from the sale of recycled or salvaged materials and
    - **b.** Landfill tipping fees saved due to diversion of materials from the landfill. The list of these materials is to include, at a minimum, the following materials:
      - i) Cardboard.
      - ii) Clean dimensional wood.
      - iii) Beverage containers.
      - iv) Land clearing debris.
      - v) Concrete.
      - vi) Bricks.
      - vii) Concrete Masonry Units (CMU).
      - viii) Asphalt.
      - ix) Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
- **B.** Resources for Development of Waste Management Plan: The following sources may be useful in developing the Draft Waste Management Plan:
  - Recycling Haulers and Markets: Local haulers and markets for recyclable materials. For more information, contact the State of Connecticut Department of Environmental Protection, Waste Management Bureau Recycling Program, (860) 424-3365,
    - www.dep.state.ct.us/wst/recycle/ctrecycle.htm.
- C. Final Waste Management Plan: The Final Waste Management Plan shall contain the following:
  - 1. Analysis of the proposed jobsite waste to be generated, including types and quantities.
  - 2. Landfill Options: The name of the landfill(s) where trash will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all Project waste in the landfill(s).
  - **3. Alternatives to Landfilling:** A list of the waste materials from the Project that will be separated for reuse, salvage, or recycling.

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- 4. Meetings: A description of the regular meetings to be held to address waste management. Refer to Section 01 31 19 "Project Meetings".
- 5. Materials Handling Procedures: A description of the means by which any waste materials identified in item (3) above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
- Transportation: A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.

#### 1.8 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: The Contractor shall designate an on-site party (or parties) responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.
- B. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner, and the Architect.
- C. Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.
- D. Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.
- E. Hazardous Wastes: Hazardous wastes shall be separated, stored, and disposed of according to local regulations.
- F. Application for Progress Payments: The Contractor shall submit with each Application for Progress Payment a Summary of Waste Generated by the Project. Failure to submit this information shall render the Application for Payment incomplete and shall delay Progress Payment. The Summary shall be submitted on a form acceptable to the Owner and shall contain the following information:
  - The amount (in tons or cubic yards) of material landfilled from the Project, the identity of the landfill, the total amount of tipping fees paid at the landfill, and the total disposal cost. Include manifests, weight tickets, receipt, and invoices.
  - For each material recycled, reused, or salvaged from the Project: the amount (in tons or cubic yards), the date removed from the jobsite, the receiving party, the transportation cost, the amount of any money paid or received for the recycled or salvaged material, and the net total cost or savings of salvage or recycling of each material shall be indicated. Attach manifests, weight tickets, receipts, and invoices.

# **PART 2 - PRODUCTS**

(Not Applicable)

# **PART 3 - EXECUTION**

#### 3.1 PLAN IMPLEMENTATION

- A. Implement the waste management plan as approved by Architect, Owner and Construction Administrator.
- Provide training of workers, contractors, subcontractors, and suppliers on proper waste management procedures.
  - Distribute waste management plan to all parties involved in the Project within three (3) days of submittal return.
  - Distribute plan to parties when they first begin working on the Project site. Review plan procedures and locations established for salvage, recycling, and disposal.

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#### 3.2 SEPARATION OF RECYCLABLE WASTE MATERIALS

- A. Provide the necessary containers and bins, to facilitate the waste management program, that are clearly and appropriately marked. Prevent contamination of recyclable materials from incompatible products and materials. Separate construction waste at the project site by one of the following methods:
  - Source Separated Method: Waste products and materials, that are recyclable, are separated from trash and sorted into appropriately marked separate containers and then transported to the respective recycling facility for further processing. Trash is transported to a landfill or incinerator.
  - 3. Co-Mingled Method: All construction waste is placed into a single container and then transported to a recycling facility where the recyclable materials are sorted and processed and the remaining trash is transported to a landfill or incinerator.
  - Recycling facilities: Provide the name of the recycling facility(-ies) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s). If materials were commingled on-site and sorted at recycling facility, the annual facility-wide recycling rate must be provided if the method of sorting is regulated by a local/state government authority.
  - 4. Other methods proposed by the Contractor and approved by the Architect, Owner and Construction Administrator.

**END OF SECTION 01 74 19** 

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## 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- **A.** This Section includes administrative and procedural requirements for handling requests for building system start up and system demonstration and includes the following:
  - 1. Starting Systems.
  - 2. Demonstration and instructions.
  - 3. Testing, adjusting, and balancing.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 45 00 "Quality Control" specifies quality assurance and inspecting services.
  - 2. Division 01 Section 01 77 00 "Closeout Procedures" specifies requirements for contract close out requirements for system operation and maintenance data and extra materials.
  - 3. Division 01, Section 01 91 00 "Commissioning" specifies process requirements for system commissioning.
  - Division 23, Section 23 08 00 "Commissioning of HVAC" specifies requirements HVAC&R system commissioning.

### 1.3 STARTING SYSTEMS

- **A.** Coordinate schedule for start-up of various equipment and systems.
- B. Provide written notification to the Construction Administrator 30 days prior to start-up of each item.
- **C.** Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, and control sequence for other conditions that may cause damage.
- **D.** Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- **E.** Verify that wiring and support components are complete and tested.
- **F.** Execute the start-up under supervision of manufacturer's representative, in accordance with manufacturer's instructions.
- **G.** When referenced in individual specification sections, require manufacturer to provide an authorized representative to be present at the site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
- **H.** Submit a written report in accordance with Division 01 Section 01 45 00 "Quality Control" that the equipment or system has been properly installed and is functioning properly.

### 1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner and Agency Personnel fourteen (14) days prior to substantial completion.
- **B.** Demonstrate Project equipment and instruct in a classroom environment at location designated by the Construction Administrator and instructed by a qualified manufacturer's representative who is knowledgeable about the Project.
- C. For equipment or systems requiring seasonal operation perform demonstration for season within six (6) months.
- **D.** Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner and Agency Personnel in detail to explain all aspects of operation and maintenance.
- **E.** Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, and maintenance, and shutdown of each item at agreed upon scheduled time and at equipment or designated location.

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- **F.** Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during demonstration.
- **G.** Starting and adjusting equipment does not constitute acceptance by the owner since commissioning is a requirement of this contract. Additionally, the warrantee does not begin until substantial completion has been granted for that specific item.

# 1.5 TESTING, ADJUSTING, AND BALANCING

- A. The Contractor will employ and pay for the testing services of an independent consultant to verify the testing, adjusting, and balancing.
  - Comply with the requirements of Division 01 Section 01 91 00 "Commissioning" as they relate to the Work
    of this Section.
- **B.** Reports will be submitted by the independent testing consultant to the Construction Administrator indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.
- **C.** The Owner may employ and pay for the services of an independent consultant to verify testing, adjusting, and balancing which was performed by the Contractor.

# PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 75 00

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## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- **A.** This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
  - 1. Inspection procedures.
  - 2. Project record document submittal.
  - 3. Operation and maintenance manual submittal.
  - 4. Submittal of warranties.
  - 5. Final cleaning.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 11 00 "Summary of Work".
  - Division 01 Section 01 29 76 "Progress Payment Procedures".
- **C.** Closeout requirements for specific construction activities may be included in the appropriate Sections in Divisions 02 through 49.

## 1.3 SUBSTANTIAL COMPLETION

- A. General: Basic contract definitions are included in Article 1 of the General Conditions of the Contract for Construction.
- **B. Preliminary Procedures:** Before requesting inspection for Certification of Substantial Completion, complete the following. List exceptions in the request.
  - 1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.
    - a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
    - b. If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
  - 2. Advise the Owner of pending insurance changeover requirements.
  - Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
  - Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, certificates of compliance, operating certificates, and similar releases.
  - Submit record drawings, maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
  - 6. Deliver tools, spare parts, extra stock, and similar items.
  - 7. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.
  - 8. Demonstrate, thru operation and testing, the functions of all systems and/or equipment to the satisfaction of the Owner for compliance to the Contract. Complete testing of systems and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.
  - 9. Complete final cleanup requirements.
  - 10. Certify that required training of personnel is complete.

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- C. Inspection Procedures: The Contractor shall be ready and prepared when they request a Substantial Completion inspection. If the inspection reveals that the work is not complete, that there are extensive punchlist items that will take more than ninety (90) days to complete and as the items listed in Article 1.3 above are not complete, the Construction Administrator, Architect, and Owner will determine the inspection has failed.
- **D.** The Contractor is responsible for all costs to re-inspect due to a failed inspection. The Owner will issue a deduct change order to cover all costs for re-inspection.
  - 1. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
  - 2. Results of the completed inspection will form the basis of requirements for final acceptance.

### 1.4 ACCEPTANCE

- A. Preliminary Procedures: Before requesting final inspection for "Certificate of Acceptance" and final payment, complete the following. List exceptions in the request.
  - Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
  - 2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
  - Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
  - 4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
  - 5. Submit consent of surety to Final Payment.
  - 6. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  - 7. Touch up and otherwise repair and restore marred, exposed finishes, including touchup painting.
- **B.** Re-inspection Procedure: The Inspection Group will re-inspect the Work upon receipt of notice from the Construction Administrator that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Owner.
  - Upon completion of re-inspection, the Construction Administrator will prepare a Certificate of Acceptance.
     If the Work is incomplete, the Construction Administrator will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

# 1.5 AS-BUILT DOCUMENT SUBMITTALS

- A. General: The Contractor shall not use As-built Drawings for construction purposes. Protect contractor As-built Drawings from deterioration and loss in a secure, fire-resistant location. Provide access to As-built Drawings for the Architect's reference during normal working hours. Keep documents current; do not permanently conceal any work until required information has been recorded. IMPORTANT NOTE: Failure to keep As-built Documents current is sufficient cause to withhold progress payments.
  - 1. The Contractor shall also hire the services of a Surveyor registered in the State of Connecticut to conduct a final survey to determine the location of exterior underground utility lines and to record the results, and update existing electronic media.
  - The record of exterior underground utilities shall be made at the time of installation on Mylar film drawing and AutoCAD (latest version) compatible disks. The drawing shall bear the seal of the Land Surveyor and a statement of accuracy.
- B. As-built Drawings: The Contractor shall maintain one (1) clean, complete undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date. Update As-built Drawings on a monthly basis coincident with the submittal of the Application for Payment.
  - Mark record sets with erasable pencil to distinguish between variations in separate categories of the Work.

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- 2. Mark all new information that is not shown on Contract Drawings.
- Note related change-order numbers where applicable.
- Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.
- Upon completion of the work, the Contractor shall submit Record Drawings to the Construction Administrator for the Owner's Records who will pass them on to the Architect or Engineer for transferring the changes to the Record Drawing Mylar Tracings.
- 6. Submit electronic format data of all Coordination Drawings as required by the Owner, at no additional
- 7. Refer to Section 01 45 00 "Quality Control" Article 1.3 for required as-built drawings and specifications for fire alarm systems.
- C. Record Specifications: The Contractor shall maintain one (1) complete copy of the Project Manual, including Addenda. Include with the Project Manual one (1) copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.
  - Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
  - Give particular attention to equals and substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
  - Note related record drawing information and Product Data.
  - Upon completion of the Work, submit Record Specifications to the Construction Administrator for the Owner's records.
- D. Record Product Data: The Contractor shall maintain one (1) copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.
  - Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
  - Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
  - Upon completion of markup, submit complete set of Record Product Data to the Construction Administrator for the Owner's records.
- E. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Construction Administrator, Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.
- Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Construction Administrator for the Owner's records.
- G. Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder according to Division 01 Section 01 78 23 "Operation & Maintenance Data". Included but not limited to the following types of information:
  - Emergency instructions.
  - Spare parts list.
  - Copies of warranties.
  - Wiring diagrams.
  - **5**. Recommended "turn-around" cycles.
  - Inspection procedures.
  - 7. Shop Drawings and Product Data.

CT DAS 5200 (Rev. 02.01.18) PROJECT NO.: BI-CTC-467 Fixture lamping schedule.

# PART 2 - PRODUCTS (Not Applicable)

# **PART 3 - EXECUTION**

#### 3.1 **CLOSEOUT PROCEDURES**

- A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:
  - 1. Maintenance manuals.
  - 2. Record documents.
  - Spare parts and materials.
  - 4. Tools.
  - 5. Lubricants.
  - 6. Fuels.
  - 7. Identification systems.
  - 8. Control sequences.
  - 9. Hazards.
  - Cleaning.
  - 11. Warranties and bonds.
  - 12. Maintenance agreements and similar continuing commitments.
- B. As part of instruction for operating equipment, demonstrate the following procedures:
  - 1. Startup.
  - 2. Shutdown.
  - Emergency operations.
  - 4. Noise and vibration adjustments.
  - 5. Safety procedures.
  - 6. Economy and efficiency adjustments.
  - Effective energy utilization.

#### 3.2 **FINAL CLEANING**

- General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 01 Section 01 50 00 "Temporary Facilities and Controls."
- B. Cleaning: Employ professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.
  - Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion and Certification of Occupancy.
  - 2. Interior:
    - Remove labels that are not permanent labels.
    - Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove paint spots; wash and polish glass.

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- Clean exposed interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
- d. Wash washable surfaces of mechanical, electrical equipment and fixtures and replace filters, clean strainers on mechanical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
- e. Clean and polish finish hardware.
- Clean and polish tile and other glazed surfaces. f.
- Clean floors; wax and buff resilient tile. Clean vinyl or rubber base.
- Vacuum and/or dust walls, ceilings, lighting fixtures, ceiling diffusers and other wall and ceiling items.
- i. Remove defacements, streaks, fingerprints and erection marks.

#### 3. Exterior:

- a. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth, even-textured surface.
- b. Clean exposed exterior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances.
- Clean roofs, gutters and downspouts.
- Remove waste and surplus materials, rubbish and construction equipment and facilities from the site, and deposit it legally elsewhere.
- Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove paint spots; wash and polish
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the work of rodents, insects, and other pests. Provide results of final inspection in writing.
- D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.
- E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.
  - Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Construction Administrator.
  - Leave building clean and ready for occupancy. If the Contractor fails to clean up, the Owner may do so, with the cost charged to the Contractor. The Owner will issue a credit change order to cover the costs.

END OF SECTION 01 77 00

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#### 1.1 **RELATED DOCUMENTS**

 Drawings and general provisions of the Contract, including Division 00 General Conditions and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- This Section includes administrative and procedural requirements for operation and maintenance manuals, including the following:
  - 1. Preparing and submitting operation and maintenance manuals for building operating systems and equipment.
  - Preparing and submitting instruction manuals covering the care, preservation, and maintenance of architectural products and finishes.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - Division 01 Section 01 33 00 "Submittal Procedures" specifies preparation of Shop Drawings and Product
  - Division 01 Section 01 75 00 "Starting and Adjusting" specifies instruction of the Owner and Agency operating personnel in the operation and maintenance of building systems and equipment and the general requirements for starting-up equipment and systems.
  - Division 01 Section 01 77 00 "Closeout Procedures" specifies general closeout requirements.
  - Division 01 Section 01 78 30 "Warranties and Bonds" specifies requirements for submittal of warranties and bonds.
  - Division 01 Section 01 81 13 "Sustainable Design Requirements" specifies requirements for submittals related to green building certification.
  - Division 01 Section 01 91 00 "Commissioning" specifies requirements for submittals related Commissioning.
  - Appropriate Sections of Divisions 02 through 49 specify special operation and maintenance data requirements for specific pieces of equipment or building operating systems.

#### 1.3 **QUALITY ASSURANCE**

- Maintenance Manual Preparation: In preparation of maintenance manuals, use personnel thoroughly trained and experienced in operation and maintenance of equipment or system involved.
  - Where maintenance manuals require written instructions, use personnel skilled in technical writing where necessary for communication of essential data.
  - Where maintenance manuals require drawings or diagrams, use draftsmen capable of preparing drawings clearly in an understandable format.
- B. Instructions for the Owner and Agency Personnel: The Construction Manager must use experienced instructors thoroughly trained and experienced in operation and maintenance of equipment or system involved, to instruct the Owner's operation and maintenance personnel.
- Commissioning (Cx) Coordination: The Commissioning process requires detailed O&M documentation. The Contractor must submit O&M manuals to the Construction Administrator for review and approval by Commissioning Agent (CxA).

#### **SUBMITTALS** 1.4

- Submittal Schedule: Comply with the following schedule for submitting operation and maintenance manuals:
  - Before Substantial Completion, when each installation that requires operation and maintenance manuals is nominally complete, submit four (4) draft copies of each manual to the Owner's Representative, Commissioning Agent (CxA), Agency Representative, and Architect for review. Include a complete index or table of contents of each manual.
    - The Owner's Representative will return one (1) copy of the draft with comments within twenty one (21) calendar days of receipt.

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- **b.** Submit four (4) copies of data in final form at least twenty-one (21) calendar days before final inspection. The Owner's Representative will return one (1) copy within twenty-one (21) calendar after final inspection, with comments.
- 2. After final inspection, make corrections or modifications to comply with the Commissioning Agent's (CxA), Architect's, and Agency Representative's comments. Submit final copies to the Owner's Representative within twenty-one (21) calendar days of receipt of the Commissioning Agent's (CxA), Architect's, and Agency Representative's comments.
- **B.** Form of Submittal: Prepare operation and maintenance manuals in the form of an instructional manual for use by the Owner's operating personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar equipment into a single binder.
  - 1. **Binders:** For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2-by-11- inch paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.
    - a. Where two (2) or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the piece of equipment or system.
    - b. Identify each binder on front and spine, with the printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.
  - 2. **Dividers:** Provide heavy paper dividers with celluloid-covered tabs for each separate section. Mark each tab to indicate contents. Provide a typed description of the product and major parts of equipment included in the section on each divider.
  - 3. Protective Plastic Jackets: Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
  - **4. Text Material:** Where maintenance manuals require written material, use the manufacturer's standard printed material. If manufacturer's standard printed material is not available, provide specially prepared data, neatly typewritten, on 8-1/2-by-11-inch, 20-lb/sq ft white bond paper.
  - 5. **Drawings:** Where maintenance manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.
    - **a.** Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
    - **b.** If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents, and drawing location at the appropriate location in the manual.

# 1.5 MANUAL CONTENT

- **A.** In each manual include information specified in the individual Specification Section and the following information for each major component of building equipment and its controls:
  - 1. General system or equipment description.
  - 2. Design factors and assumptions.
  - 3. Copies of applicable shop drawings and product data.
  - 4. System or equipment identification, including:
    - a. Name of manufacturer.
    - b. Model number.
    - c. Serial number of each component.
  - 5. Operating instructions.
  - 6. Emergency instructions.
  - 7. Wiring diagrams.
  - 8. Inspection and test procedures.
  - 9. Maintenance procedures and schedules.

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- 10. Precautions against improper use and maintenance.
- 11. Copies of warranties.
- 12. Repair instructions including spare parts listing.
- 13. Sources of required maintenance materials and related services.
- 14. Manual index.
- B. Organize each manual into separate sections for each piece of related equipment. As a minimum, each manual shall contain a title page; a table of contents; copies of product data, supplemented by drawings and written text; and copies of each warranty, bond, and service contract issued.
  - Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. Provide the following information:
    - Subject matter covered by the manual.
    - b. Name and address of the Project.
    - Date of submittal.
    - d. Name, address, and telephone number of the Construction Manager.
    - Name and address of the Architect and Owner's Representative.
    - Cross-reference to related systems in other operation and maintenance manuals.
  - Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Project Manual format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume.
    - Where a system requires more than one volume to accommodate data, provide a comprehensive table of contents for all volumes in each volume of the set.
  - Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or Installer and the maintenance subcontractor. Clearly delineate the extent of responsibility of each of these entities. Include a local source for replacement parts and equipment.
  - Product Data: Where the manuals include manufacturer's standard printed data, include only sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one (1) item in a tabular format, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.
  - Written Text: Prepare written text to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure.
  - Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in project record drawings to assure correct illustration of the completed installation.
    - Do not use original Record Documents as part of operation and maintenance manuals.
  - Warranties and/or Bonds: Provide a copy of each warranty and/or bond in the appropriate manual for the information of the Owner's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect validity of warranty or bond.

#### MATERIAL AND FINISHES MAINTENANCE MANUAL 1.6

Submit four (4) copies of each manual, in final form, on material and finishes to the Owner's Representative for distribution. Provide one (1) section for architectural products, including applied materials and finishes. Provide a second section for products designed for moisture protection and products exposed to the weather.

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- Refer to individual Specification Sections for additional requirements on care and maintenance of materials and finishes.
- **B.** Architectural Products: Provide manufacturer's data and instructions on care and maintenance of architectural products, including applied materials and finishes.
  - Manufacturer's Data: Provide complete information on architectural products, including the following, as applicable:
    - a. Manufacturer's catalog number.
    - b. Size.
    - c. Material composition.
    - d. Color.
    - e. Texture.
    - Reordering information for specially manufactured products.
  - 2. Care and Maintenance Instructions: Provide information on care and maintenance, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information on cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance.
- C. Moisture Protection and Products Exposed to the Weather: Provide complete manufacturer's data with instructions on inspection, maintenance, and repair of products exposed to the weather or designed for moisture-protection purposes.
  - Manufacturer's Data: Provide manufacturer's data giving detailed information, including the following, as applicable:
    - a. Applicable standards.
    - b. Chemical composition.
    - c. Installation details.
    - Inspection procedures.
    - e. Maintenance information.
    - f. Repair procedures.

### 1.7 EQUIPMENT AND SYSTEMS MAINTENANCE MANUAL

- A. Submit four (4) copies of each manual, in final form, on equipment and systems to the Owner's Representative for distribution. Provide separate manuals for each unit of equipment, each operating system, and each electric and electronic system.
  - 1. Refer to individual Specification Sections for additional requirements on operation and maintenance of the various pieces of equipment and operating systems.
- **B.** Equipment and Systems: Provide the following information for each piece of equipment, each building operating system, and each electric or electronic system.
  - 1. Description: Provide a complete description of each unit and related component parts, including the following:
    - Equipment or system function.
    - b. Operating characteristics.
    - c. Limiting conditions.
    - d. Performance curves.
    - e. Engineering data and tests.
    - f. Complete nomenclature and number of replacement parts.
  - 2. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following:
    - a. Printed operation and maintenance instructions.
    - b. Assembly drawings and diagrams required for maintenance.
    - c. List of items recommended to be stocked as spare parts.

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- 3. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following:
- Operating Procedures: Provide information on equipment and system operating procedures, including the following:
  - a. Startup procedures.
  - b. Equipment or system break-in.
  - Routine and normal operating instructions.
  - Regulation and control procedures.
  - Instructions on stopping.
  - Shutdown and emergency instructions. f.
  - Summer and winter operating instructions.
  - Required sequences for electric or electronic systems.
  - Special operating instructions.
- **Servicing Schedule:** Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.
- Controls: Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.
- 7. Identification Drawings: Provide each Subcontractor's Identification Drawings.
  - **a.** Provide as-installed, color-coded, piping diagrams, where required for identification.
- Valve Tags: Provide charts of valve-tag numbers, with the location and function of each valve.
- Circuit Directories: For electric and electronic systems, provide complete circuit directories of panel boards, including the following:
  - a. Controls.
  - b. Communication.

### C. Electronic Media:

- For equipment which requires maintenance by operational personnel, provide a professionally developed DVD for the use of maintenance training for the facility. Each DVD will be accompanied by a written index which can be utilized to find any specific item of information by time or place on the DVD.
- The Construction Manager is responsible for this production. This DVD will be provided to the Owner's Representative at the same time as the delivery of the other maintenance material.
- The DVD must be able to be edited for future changes to the equipment and modifications as they occur.

#### 1.8 COMMISSIONING RECORD AND TESTING DATA MANUAL

The Contractor shall cooperate with Commissioning Agent (CxA) in the preparation of a separate Manual dedicated to documenting the Commissioning process which will include all certifications and testing data and some repeating of O&M data. Description of this Manual is found in Section 01 91 00 Commissioning and shall be prepared by the Commissioning Agent (CxA).

# PART 2 - PRODUCTS (Not Applicable)

# PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 78 23

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#### 1.1 **RELATED DOCUMENTS**

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- This Section includes administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
  - 1. Refer to the General Conditions for terms of the Contractor's period for correction of the Work.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Division 01 Section 01 33 00 "Submittal Procedures" specifies procedures for submitting warranties.
  - Division 01 Section 01 77 00 "Closeout Procedures" specifies contract closeout procedures.
  - Division 01 Section 01 78 23 "Operation and Maintenance Data" specifies required operation and maintenance data.
  - Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.
  - Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- C. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

#### 1.3 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.
  - Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
- E. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.
- F. The Contractor shall guarantee all materials and workmanship for a period of eighteen (18) months from the date of Substantial Completion of the Work. In addition, the Contractor shall furnish the warranties listed below. Submit four (4) copies of each to the Construction Administrator in the supplier's standard form or in the form given below if there is no standard form available.

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**G. Specification/Warranty Table:** The General Contractor shall provide for all warranties as shown in the Specification/Warranty table:

			Specification / Warranty Table
Item No.	Se	ction No.	Specification Product/Warranty
1.	03	3000	Floor hardener:
			5 year, material and workmanship.
2.	05	9500	_ Expansion Joint Covers:
			5 year material & workmanship.
3.	07	5416	Single-Ply Membrane Roofing, Base Flashing and Insulation:
			<b>30</b> year unlimited, materials and installation [the manufacturer's no
			dollar limit (NDL) warranty], and;
		4400	2 year General Contractor's warranty for installation.
5.	07	4120	Metal Roofing and Siding:
			year against rupture, cracks or perforation due to corrosion, and;
			20 year for fluorocarbon finish (if used) against peeling, blistering,
			fading and chalking as limited by industry standards, and;  10 year weathertightness warranty by General Contractor's installer.
7.	07	7100	10 year weathertightness warranty by General Contractor's installer. Vents and Hatches:
	O1	7100	5 year product and installation, including weathertightness.
10.	07	9500	Exterior Expansion Joint Covers:
10.	01	3300	5 year material and workmanship, including weathertightness.
12.	07	9200	Exterior - Interior Caulking and Sealants:
	•		5 year, material and workmanship.
13.	07	6200	Metal Flashing and Sheet Metal:
-	-		3 year, material and workmanship.
16.	08	1416	Solid Wood Core and Mineral Core doors:
			Lifetime for interior doors.
17.	08	3323	Overhead Doors (coiling or sectional):
			5 year material and workmanship.
19.	08	7100	Closers, Locksets, Exit Bolts:
			Longest term offered by manufacturer for grade/class of particular item,
			material and workmanship.
-			material and Heritinaherilp.

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			Specification / Warranty Table (Continued)
Item No.	Sa	ction No.	Specification Product/Warranty
20.	08	8000.	Insulating glass:
20.	00	4413	ilibulating glabb.
		<del>- 1113</del>	- <b>10</b> year against failure of hermetic seal, interpane dusting, or misting
			including replacement of unit.
22.	08	8000	Laminated Glass:
			10 year against delamination.
23.	08	4113,	Storefront/Curtain Wall:
		4413	
			5 year material and workmanship (insulating glass separate). Air and
			water infiltration and strength to specified AAMA designation.
			15 year for metal finish
24.	09	6813	_ Carpet:
			10 year wear and color fastness, and;
			year installation.
25.	10	2239	Operable Partitions:
			Years, material, and workmanship.
26.	10	8000	_ Mirrors:
			15 years against silver spoilage.
32	23	2123	Compressors and Pumps:
			5 years, material and installation,
33	26	6111	_ Dimming Controls:
			8 years, material and installation,
34	26	2416	Switchboards and Panels:
	00	F400	5 years, material and installation,
37	26	5100,	Emergency Lighting Batteries:
		5110	
38	26	5100,	10 years, material and installation, Lighting Ballasts:
30	20	5100, 5110	Lighting ballasts.
		3110	5 years, material and installation,
39	32	9300	Plant Material, Turf and Grasses:
33	32	3300	24 months, material and installation, and growth.
			24 months, material and installation, and growth.

H. Submit certification that finish materials are fire rated as specified.

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J. Form of Warranty: Warranties shall be submitted in following format:

Warranty						
Commissioner: Melody A. Currey Department of Administrative Services DAS Commissioner's Office 450 Columbus Boulevard, Suite 1501 Hartford, CT 06103						
Project Number: BI-CTC-467 Project Title: Master Plan Phase III Renovations and Additions, Norwalk Community College						
I (We) hereby warranty						
the work on the referenced project for a period of years						
from , 20 against failures of workmanship and materials in accordance						
with the requirements of Section, Page, Paragraph, of the Specifications.						
Installer  Subcontractor  Vendor/Suppliers  Manufacturer						
Installer or Subcontractor or Vendor/Suppliers or Manufacturer Name:						
Installer or Subcontractor or Vendor/Suppliers or Manufacturer Signature:						
General Contractor's Name						
General Contractor's Signature:						
or						
General Contractor's Authorized Agent Signature:						

- K. Bonds shall be by approved Surety Companies, made out to the Commissioner, Department of Administrative Services on companies' standard form.
- L. Warranties, Guarantees, or bonds supplied by the General Contractor's Subcontractors or Vendors/Suppliers or Manufacturers shall reference the project name, number, and location and be certified by the General Contractor to be for the product and installation on the project and must be countersigned by the General
- M. Bonds shall be by approved Surety Companies, made out to the Commissioner, Department of Administrative Services, on company's standard form.
- N. Guarantees, warranties or bonds supplied by Subcontractors, Suppliers or Manufacturers shall reference the project name, number, and location and be certified by the Contractor to be for the product and installation on the project and must be countersigned by the Contractor.

#### 1.4 **SUBMITTALS**

Submit written warranties prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.

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- B. Forms for special warranties are included in this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Submit a draft to the Owner, through the Construction Administrator, for approval prior to final execution.
  - Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Form of Submittal: At Final Completion compile two (2) copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- D. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  - Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
  - Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
  - When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not applicable)

END OF SECTION 01 78 30

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## **PART 1- GENERAL**

### 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to this section.

### 1.2 SUMMARY

### A. Section Includes:

- A. Implement practices and procedures to meet the project's environmental goals, which include achieving a LEED™ 2009 New Construction-Silver rating. Specific project goals which may impact this and the other sections of this specification include: use of recycled-content materials; use of locally-manufactured materials; use of low-emitting materials; use of certified wood products; construction waste recycling; and the implementation of a construction indoor air quality management plan. Ensure that the requirements related to these goals, as defined in this Section and other Sections of the contract documents, are implemented to the fullest extent. Substitutions or other changes to the work shall not be allowed if such changes substantially compromise the stated LEED Building criteria.
  - General requirements and procedures for compliance with certain USGBC LEED prerequisites and credits needed for project to obtain LEED Silver certification using LEED-NC, Version 3
    - a. Other LEED prerequisites and credits needed to obtain certification depend on material selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits] may be used as one (1) criterion to evaluate substitution requests and comparable product requests.
    - b. Additional LEED prerequisites and credits] needed to obtain the indicated certification depend on Architect's design and other aspects of project that are not part of the Work of the Contract.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - Divisions 01 through 49 sections for LEED requirements specific to the work of each of these sections.
     Requirements may or may not include reference to LEED.

### 1.3 DEFINITIONS

- A. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship." Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- B. LEED: Leadership in Energy & Environmental Design.
- C. Rapidly Renewable Materials: Materials made from plants that are typically harvested within a 10-year or shorter cycle. Rapidly renewable materials include products made from bamboo, cotton, flax, jute, straw, sunflower seed hulls, vegetable oils, or wool.
- D. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles of project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.
- E. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
  - **F.** "Post-consumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
  - **G.** "Pre-consumer" material is defined as material diverted from the waste stream during the manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

## 1.4 SUBMITTALS

A. Submit under provisions of Division 01 Section 01 33 00 "Submittal Procedures."

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- B. General: Submit additional LEED submittals required by other specification sections.
- C. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.
- **D. Project Materials Cost Data:** Provide statement indicating total cost for building materials used for project, excluding mechanical, electrical, and plumbing components, and specialty items such as elevators and equipment. Include total cost for wood-based materials used for project.
- **E. LEED Action Plans:** Provide preliminary submittals within 30 days of date established for Notice to Proceed indicating how the following requirements will be met:
  - Waste Management Plan complying with Division 01 Section 01 74 19 "Construction Waste Management and Disposal."
  - 2. Salvaged and Refurbished Materials List: Identify each material that will be salvaged or refurbished, including its source and cost.
  - 3. Recycled Content Materials List: Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.
  - 4. Certified Wood Products List: Indicate each product containing certified wood, including its source and cost of certified wood products.
  - Construction Indoor-air-quality Management Plan complying with Division 01 Section 01 57 40 "Construction IAQ Management Plan."
- **F. LEED Progress Reports:** Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:
  - Waste Reduction Progress Reports complying with Division 01 Section 01 74 19 "Construction Waste Management and Disposal."
  - 2. Salvaged and refurbished materials.
  - 3. Recycled content.
  - 4. Regional materials.
  - Certified wood products.

### G. LEED Documentation Submittals:

- 1. Product data and wiring diagrams for sensors and data collection system used to provide continuous metering of building energy-consumption performance over a period of time of not less than one (1) year of post-construction occupancy.
- 2. Waste Management Plan: Comply with Division 01 Section 01 74 19 "Construction Waste Management and Disposal."
- 3. Salvaged and Refurbished Materials: Receipts for salvaged and refurbished materials used for project, indicating sources and costs for salvaged and refurbished materials.
- 4. Recycled Content: Product data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.
- 5. Regional Materials: Product data indicating location and distance from project of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include statement indicating cost for each regional material and the fraction by weight that is considered regional.
- Certified Wood Products: Product data and chain-of-custody certificates for products containing certified wood. Include statement indicating cost for each certified wood product.
- Indoor Environmental Quality:
  - a. Construction indoor-air-quality management plan.
  - b. Product data for temporary filtration media.
  - c. Product data for filtration media used during occupancy.
  - d. Construction Documentation: Six (6) photographs at three (3) different times during the construction period, along with a brief description of the SMACNA approach employed,

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documenting implementation of the indoor-air-quality management measures, such as protection of ducts and on-site stored or installed absorptive materials.

- 8. Indoor Environmental Quality:
  - a. Signed statement describing the building air flush-out procedures including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
  - b. Product data for filtration media used during flush-out and during occupancy.
  - c. Report from testing and inspecting agency indicating results of indoor-air-quality testing and documentation showing compliance with indoor-air-quality testing procedures and requirements.
- 9. Adhesives and Sealants: Product data for adhesives and sealants used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L.
- Paints and Coatings: Product data for paints and coatings used inside the weatherproofing system indicating VOC content of each product used. Indicate VOC content in g/L.
- 11. Carpet Systems: Product data for carpet and carpet cushion installed in the building interior indicating that the product complies with the CRI Green Label Plus testing program. Product data for carpet adhesives used in the building indicating VOC content in g/L.
- 12. Composite Wood, Agrifiber or Wood Glues: Product data for products containing composite wood or agrifiber products or wood glues indicating that they do not contain urea-formaldehyde resin.

### **PART 2 - PRODUCTS**

### 2.2 RECYCLED CONTENT OF MATERIALS

- **A. Recycled Content Materials:** Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 20 percent of cost of materials used for project.
  - 1. Cost of post-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.
  - 2. Cost of post-consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by total weight of the item and multiplying by cost of the item.
  - 3. Do not include mechanical and electrical components in the calculation.

### 2.3 REGIONAL MATERIALS

A. Regional Materials: Provide 20 percent of building materials (by cost) that are regional materials.

### 2.4 CERTIFIED WOOD

- A. Certified Wood Products: Provide a minimum of 50 percent (by cost) of wood-based materials that are produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
  - Wood-based materials include, but are not limited to, the following materials when made from wood, engineered wood products, or wood-based panel products:
    - a. Rough carpentry.
    - b. Miscellaneous carpentry.
    - c. Heavy timber construction.
    - d. Wood decking.
    - e. Metal-plate-connected wood trusses.
    - f. Structural glued-laminated timber.
    - g. Finish carpentry.
    - h. Architectural woodwork.

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- i. Wood paneling.
- Wood veneer wall covering.
- k. Wood flooring.
- I. Wood lockers.
- m. Wood cabinets.

### 2.5 LOW-EMITTING MATERIALS

- A. Adhesives, Sealants, and Sealant Primers: For field applications that are inside the weatherproofing system, use adhesives, sealants, and sealant primers that comply with the South Coast Air Quality Management District (SCAQMD) Rule #1168 effective July 1, 2005 and the rule amendment dated January 7, 2005.
  - Aerosol Adhesives: Comply with the requirements of the Green Seal Standard for Commercial Adhesives GS-36 in effect on October 19, 2000.
- **B.** Paints and Coatings: For field applications that are inside the weatherproofing system, use paints and coatings that comply with the following limits for VOC content:
  - Architectural Paints, Coatings, and Primers Applied to Interior Walls and Ceilings: Do not exceed the VOC content limits established in Green Seal Standard GS-11, Paints, First Edition dated May 20, 1993:
    - a. Flats: 50 g/L.
    - b. Non-flats: 150 g/L.
  - Anti-corrosive and Anti-rust Paints Applied to Ferrous Metal Substrates: Do not exceed the VOC content limit of 250 g/L established in Green Seal Standard GC-03, Anti-Corrosive Paints, Second Edition dated January 7, 1997.
  - 3. Clear Wood Finishes, Floor Coatings, Stains, Sealers, and Shellacs Applied to Interior Elements: Do not exceed the VOC content limits established in the South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings in effect on January 1, 2004:
    - a. Clear Wood Finishes: Varnish not more than 350 g/L; Lacquer not more than 550 g/L.
    - b. Floor Coatings: VOC not more than 100 g/L.
    - Sealers: Waterproofing sealers not more than 250 g/L; Sanding sealers not more than 275 g/L;
       All other sealers not more than 200 g/L.
    - d. Shellacs, Clear: VOC not more than 730 g/L.
    - e. Shellacs, Pigmented: VOC not more than 550 g/L.
    - f. Stains: VOC not more than 250 g/L.

# C. Carpet Systems:

- 1. Carpet: Meet the requirements of the Carpet and Rug Institute's (CRI) Green Label Plus Program.
- 2. Carpet Cushion: Meet the requirements of CRI's Green Label Program.
- 3. Carpet Adhesive: VOC content of not more than 50 g/L.
- **D.** Composite Wood and Agrifiber Products: Do not use composite wood or agrifiber products or adhesives that contain added urea-formaldehyde resin.

## **PART 3 - EXECUTION**

# 3.1 REFRIGERANT AND CLEAN-AGENT FIRE-EXTINGUISHING-AGENT REMOVAL

- A. Fundamental Refrigerant Management: Remove CFC-based refrigerants from existing HVAC&R equipment indicated to remain and replace with refrigerants that are not CFC based. Replace or adjust existing equipment to accommodate new refrigerant as described in Division 23 sections.
- **B.** Enhanced Refrigerant Management: Remove clean-agent fire-extinguishing agents that contain HCFCs or halons and replace with agent that does not contain HCFCs or halons. Refer to Division 21 sections additional requirements.

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### 3.2 CONSTRUCTION WASTE MANAGEMENT

**A.** Construction Waste Management: Comply with Division 01 Section 01 74 19 "Construction Waste Management and Disposal."

### 3.3 CONSTRUCTION INDOOR-AIR-QUALITY MANAGEMENT

- A. Construction IAQ Management Plan During Construction: Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."
  - If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Division 01 Section 01 50 00 "Temporary Facilities and Controls", install filter media having a MERV 8 according to ASHRAE 52.2 at each return-air inlet for the air-handling system used during construction.
  - 2. Replace all air filters immediately prior to occupancy.
- B. Construction IAQ Management Plan Before Occupancy: [Comply with one of the following requirements:]
  - After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14000 cu ft of outdoor air per sq ft of floor area while maintaining an internal temperature of at least 60 degrees F and a relative humidity no higher than 60 percent.

OR

2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu ft of outdoor air per sq ft of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq ft of outside air or the design minimum outside air rate determined in Sections 4 through 7 of ASHRAE Standard 62.1-2004, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three (3) hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14000 cu ft/sq ft of outside air has been delivered to the space.

END OF SECTION 01 81 13

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## **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS

**A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 specification sections, apply to this section.

### 1.2 SUMMARY

- A. This Section includes equipment and system commissioning, including the following:
  - 1. Completion of commissioning procedures on specific equipment and systems as indicated under "Related Sections" below.
  - 2. Verification of operational and functional performance of specific equipment and systems for compliance with the "Design Intent" as described in the "Related Sections" indicated below.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
  - Section 01 31 00 "Project Management and Coordination" specifies procedures for coordinating the Commissioning Process.
  - 2. Division 01 Section 01 33 00 "Submittal Procedures" specifies procedures for submittal of Product Data and Quality Assurance Submittals.
  - 3. Division 01 Section 01 77 00 "Closeout Procedures" specifies general closeout requirements.
  - **4.** Division 07 Section 07 08 00 "Commissioning of Building Assemblies" specifies closeout and/or commissioning related requirements for specific building envelope systems.
  - 5. Division 21 Section 21 08 00 "Commissioning of Fire Suppression" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
  - 6. Division 22 Section 22 08 00 "Commissioning of Plumbing" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
  - 7. Division 23 Section 23 08 00 "Commissioning of HVAC" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.
  - **8.** Division 26 Section 26 08 00 "Commissioning of Electrical Systems" specifies closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.

# 1.3 DEFINITIONS

- A. Basis of Design (BOD): A document that records the concepts, calculations, decisions, and product selections used to meet the Owner's Project Requirements and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- **B.** Commissioning Agent (CxA): An entity identified by the Owner who leads, plans, schedules, and coordinates the commissioning team to implement the Commissioning Process.
- **C.** Commissioning (Cx) Plan: A plan that includes a list of all equipment to be commissioned, delineation of roles for each of the primary commissioning participants, and details on the scope, timeline, and deliverables throughout the commissioning process."
- C. Deficiencies and Resolutions List: List of noted deficiencies discovered as result of commissioning process.
- **E. Final Commissioning Report:** Overall final commissioning document (see 1.6, I(2) below), prepared by the Commissioning Agent, which details the actual commissioning procedures performed, inspection and testing results, and the final version of the deficiencies and resolutions list indicating that all issues discovered through the commissioning process have been verified as resolved.
- **F. Functional Completion:** Functional Completion is when all remaining TAB (Testing, Adjusting, Balancing) and commissioning responsibilities of the Contractor and their subcontractor's (except for seasonal or approved deferred testing and controls training), have been functionally certified as complete by the Owner's Commissioning Agent (CxA) and the Certificate of Functional Completion has been issued.

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- **G.** Functional Performance Testing Process: Documented testing of system parameters, under actual or simulated operating conditions. Functional testing is the dynamic testing of systems (rather than just components).
- **H. Pre-Commissioning Checklists:** Installation and start-up items to be completed by the appropriate party prior to operational verification through Functional Testing.
- Physical Inspection Process: On-site inspection and review of related system components for conformance to the specifications.
- J. Seasonal Commissioning Tests: Functional Tests that are deferred until the system(s) will experience conditions closer to their intended design conditions.
- **K.** Trending: Monitoring using the building control system.

### 1.4 COORDINATION

- A. Commissioning Team: The members of the commissioning team consist of the Commissioning Agent (CxA), the CT DCS Project Manager (PM), the Construction Administrator (CA), Construction Manager, the Contractor, the Architect and Design engineers (particularly the mechanical engineer), the Mechanical Subcontractor, the Electrical Subcontractor, the TAB Subcontractor, the Controls Subcontractor, any other installing subcontractors or suppliers of equipment. If known, the Agency's building or plant operator/engineer is also a member of the Commissioning team.
- **B. Management:** The CxA is hired by the Owner. The CxA directs and coordinates the commissioning activities and the reports to the CA. All members of the Commissioning Team work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents. Refer to Section 01 91 00 Part 1.6 and 1.7 for additional management details.
- C. Scheduling. The CxA will work with the CA and Contractor according to established protocols to schedule the commissioning activities. The CxA will provide sufficient notice to the CA and Contractor for scheduling commissioning activities. The Contractor will integrate all commissioning activities into their master CPM schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.
  - The CxA will provide the initial schedule of primary commissioning events at the commissioning scoping meeting. The Commissioning Plan—Construction Phase provides a format for this schedule. As construction progresses more detailed schedules are developed by the CxA. The Commissioning Plan also provides a format for detailed schedules.

### 1.5 DESCRIPTION OF CONSTRUCTION PHASE COMMISSIONING PROCESS

- A. As soon as practicable after the "Contract Start Date" the Commissioning Agent (CxA) will conduct a pre-installation commissioning "kick-off" meeting with the Subcontractors. Parties directly affected by the commissioning work will be required to attend. The CxA will explain the commissioning process in detail, and identify specific commissioning related responsibilities of the various parties.
- B. Commissioning status meetings will be scheduled to occur during construction to monitor progress and to help facilitate the commissioning process. Contractor representatives will be required to attend these meetings.
- **C.** Once Subcontractors have provided the CxA with written verification indicating completion of installation and startup procedures, the CxA will conduct an on-site physical inspection of the specific systems and equipment.
- **D.** Upon confirmation of system readiness, the CxA will schedule with the Subcontractors to perform functional compliance with the project specifications and drawings. The CxA will oversee the process and will provide the format and documentation for these tests.
- E. Deficiencies noted during these tests will be documented on the Deficiencies and Resolutions list. When corrected, issues will be resolved at the time of discovery. The responsible Contractor will resolve all other issues at a later date. All deficiencies will be noted by the CxA as either resolved or pending resolution.
- **F.** The construction commissioning process will be complete when all noted deficiencies have been corrected, proved to be compliance with the project specifications or otherwise resolved to the satisfaction of the Owner and when the CxA has issued the Certificate of Functional Completion

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## 1.6 COMMISSIONING AGENT'S (CxA's) DUTIES AND RESPONSIBILITIES

- A. Meet and communicate with the Owner's representatives, Contractor, Construction Administrator, Subcontractors, equipment manufacturers' representatives, Architect, Engineer, and others as needed, to facilitate the commissioning process.
- **B.** Review commissioning related specifications, submittals and construction documents. Communicate noted deficiencies and concerns to the Owner, Architect and Engineer.
- C. Develop detailed and specific Functional Testing procedures for equipment and systems to be commissioned.
- D. Establish testing, adjusting and balancing (TAB) requirements at a Pre-balancing meeting. Oversee the TAB process.
- **E.** Perform site inspections and verify Construction Manager's subcontractor readiness for the Functional Testing process. Document deficiencies for future resolution.
- **F.** Witness contractor performed Functional Testing process as appropriate to verify contractor compliance with the functional testing procedures. Document deficiencies for future resolution.
- **G.** Provide the Owner, Contractor, Construction Administrator, Architect, and Engineer with a Final Commissioning Report to document the commissioning process and to verify that the commissioning process is complete.
- **H.** Verify that the Contractor O&M documentation is complete.
- I. Commissioning Record in O&M Manuals.
  - The CxA is responsible to compile, organize and index the following commissioning data by equipment into labeled, indexed and tabbed, three-ring binders and deliver it to the Contractor, to be included with the O&M manuals. Three copies of the manuals will be provided. The format of the manuals shall be:
    - **1.1 Tab I-1:** Commissioning Plan;
    - **1.2 Tab I-2**: Final Commissioning Report (see (2) below)
    - **1.3 Tab 01:** System Type 1 (chiller system, packaged unit, boiler system, etc.);
      - **1.3.1 Sub-Tab A:** Design narrative and criteria, sequences, approvals for equipment in System Type 1;
      - **1.3.2 Sub-Tab B:** Startup plan and report, approvals, corrections, blank Precommissioning Checklists;
        - **.1 Colored Separator Sheets**—for each equipment type (fans, pumps, chiller, etc.);
      - **1.3.3 Sub-Tab C:** Functional tests (completed), trending and analysis, approvals and corrections, training plan, record and approvals, blank functional test forms and a recommended recommissioning schedule.
    - **1.4 Tab 02:** System Type 2.....repeat as per above requirements for System 1.
  - 2. Final Report Commissioning Report Details. The final commissioning report shall include an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the commissioning authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas:
    - **2.1** Equipment meeting the equipment specifications;
    - **2.2** Equipment installation,
    - **2.3** Functional performance and efficiency;
    - 2.4 Equipment documentation and design intent; and
    - 2.5 Operator training. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific functional test, inspection, trend log, etc. where the deficiency is documented. The functional performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.

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# 2.6 Pre-Occupancy Commissioning (Cx) Report:

A Pre-occupancy Commissioning (Cx) Report shall be prepared by the Commissioning Agent (CxA) that demonstrates that the project has met all of the requirements spelled out in the following Table:

Twelve (12) Mandatory Requirements [16a-38k-3] Summary Table:		
	Regulation	Summary Description
1.	16a-38k-3(a)	Building Commissioning:
2.	16a-38 -3(b)	Integrated Design Process:
3.	16a-38k-3(d)	ENERGY STAR Products:
4.	16a-38k-3(c)	Energy Performance:
5.	16a-38k-3(e)	Indoor Air Quality Management Plan:
6.	16a-38k-3(f)	Water Usage:
7.	16a-38k-3(g)	Recycling of Materials:
8.	16a-38k-3(h)	Erosion and Sedimentation Control:
9.	16a-38k-3(i)	No Smoking Policy:
10.	16a-38k-3(j)	Integrated Pest Management Plan:
11.	16a-38k-3(k)	Chlorofluorocarbon (CFC)-Based Refrigerants:
12.	16a-38k-3(l)	Minimum Ventilation Requirement:

## 2.7 Post-Occupancy Commissioning (Cx) Report:

A Post-Occupancy Commissioning (Cx) Report shall be prepared by the Commissioning Agent (CxA) and submitted to the CT DCS PM for review and approval. The approved Report shall be submitted by the State Agency that is responsible for the ongoing care, operation, and maintenance of the building to the CT OPM Secretary and the CT DCS Commissioner within one hundred eighty (180) days after one year of occupancy Date of CT DCS Acceptance of the Work. The Report shall include results of any post-occupancy survey of building occupants, a description of any adjustments made to equipment or building operation and the reasons for which the changes were made, and one year of all energy usage by source and water usage.

**3.** Other documentation will be retained by the CxA.

### 1.7 DUTIES AND RESPONSIBILITIES OF OTHERS FOR COMMISSIONING

- A. The commissioning process will require the active participation of persons qualified to represent the Owner, Mechanical Engineer, Electrical Engineer, Construction Manager, Equipment Manufacturers' Representatives, Mechanical Subcontractor, HVAC Subcontractor, Controls Subcontractor, TAB Subcontractor, Electrical Subcontractor, and other specific subcontractors, as deemed appropriate. The CxA will witness the final functional performance commissioning process. Participants shall include in their contracts all costs necessary to participate in and complete the commissioning process.
- **B.** The Contractor will assure the participation and co-operation of the Subcontractors, as required to complete the commissioning process.
- **C.** The Owner will assure the participation of their chosen representatives as required to complete the commissioning process.
- **D.** The Architect will assure the participation of necessary representatives from the Design Team as required to complete the commissioning process. Design team members will provide prompt replies to requests for information issued during the commissioning process.
- E. It is the Contractor's specific responsibility to complete their respective start-up and checkout procedures, and to insure the complete readiness of equipment and systems, prior to the start of the functional performance testing phase. The CxA shall request written confirmation of system readiness for performance testing, from the appropriate Contractor or Subcontractor. Once the CxA is provided with confirmation of all related systems completion, the actual date and times for the functional performance testing process will be confirmed. Contractor and Subcontractors shall provide sufficient time, and qualified representatives, to complete this process at no additional cost to the State.

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- **F.** After a second failure of a system to successfully meet the criteria as set forth in the functional performance testing process, the Contractor shall reimburse the Owner for all costs associated with any additional retesting efforts made necessary due to remaining Contractor related system deficiencies previously reported by the Contractor as corrected. These costs shall also include the costs (where applicable) for the CxA.
- **G.** Training on related systems and equipment operation and maintenance shall only be scheduled to commence after final performance commissioning is satisfactorily completed, and systems are verified to be 100 percent complete and functional.

### 1.8 SUBMITTALS

- A. Refer to Section 01 33 00 Submittal Procedures.
- **B.** Pre-Commissioning Checklist Forms: Submit signed copies of the checklist forms to the CxA upon completion of all listed items.
- **C.** Equipment Manufacturer's Startup Forms: Submit two (2) completed copies of the installation and startup checklists provided by the equipment manufacturers to the CxA.
- D. Test Reports: Submit copies of test reports for equipment and systems to the CxA.
- E. Control Schematics: Submit copies of the control schematics for equipment, systems, and subsystems to the CxA.
- **F. Inspection Records:** Submit copies of the records of inspections for code compliance, and approved permits and licenses to operate the equipment and systems to the CxA.
- **G.** Operating Data: Submit two (2) copies of equipment and system operating data including all necessary instructions to facilitate operation to specified performance standards to the Owner.
- **H. Maintenance Data:** Submit two (2) copies of equipment and system maintenance data including all necessary information required to maintain the equipment and systems in continuous operation, such as the testing, balancing and adjusting report and the as-built drawings.

### 1.9 TRAINING OF OWNER PERSONNEL

- **A.** The Contractor shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed.
- **B.** The CxA shall be responsible for overseeing and approving the content and adequacy of the training of Agency's personnel for commissioned equipment.
  - 1. The CxA shall interview the Agency's facility manager and lead engineer to determine the special needs and areas where training will be most valuable. The Construction Administrator, Agency's facility manager, and CxA shall decide how rigorous the training should be for each piece of commissioned equipment. The CxA shall communicate the results to the Contractor of Subcontractors and vendors who have training responsibilities.
  - 2. In addition to these general requirements, the specific training requirements of Owner personnel by Subcontractor and vendors are specified in Divisions 21, 22, 23, 25, 26, and 27.
  - 3. The Contractor shall require each Subcontractor and vendor responsible for training to submit a written training plan to the CxA for review and approval prior to training. The plan will cover the following elements:
    - **3.1** Equipment (included in training);
    - **3.2** Intended audience;
    - **3.3** Location of training;
    - 3.4 Objectives;
    - **3.5** Subjects covered (description, duration of discussion, special methods, etc.);
    - 3.6 Duration of training on each subject;
    - **3.7** Instructor for each subject;
    - **3.8** Methods (classroom lecture, video, site walk-through, actual operational demonstrations, written handouts, etc.);
    - 3.9 Instructor and qualifications.
  - **4.** For the primary HVAC equipment, the Controls Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others.
  - 5. The CxA shall develop an overall training plan and coordinate and schedule, with the CA, Agency Representative, and Contractor, the overall training for the commissioned systems. The CxA shall

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- develop criteria for determining that the training was satisfactorily completed, including attending some of the training, etc. The CxA shall recommend approval of the training to the CA using a standard form for submittal to the Contractor. The CA also shall sign the approval form.
- **6.** At one of the training sessions, the CxA shall present a <u>one</u> (1) hour presentation discussing the use of the blank functional test forms for re-commissioning equipment.
- 7. Video recording of the training sessions shall be provided by Contractor. The Contractor shall provide the CA, with video disks cataloged by Contractor, and added to the O&M manuals.
- 8. The HVAC design engineer shall at the first training session present the overall system design concept and the design concept of each equipment section. This presentation shall be <u>two</u> (2) hours in length and include a review of all systems using the simplified system schematics (one-line drawings) including chilled water systems, condenser water or heat rejection systems, heating systems, fuel oil and gas supply systems, supply air systems, exhaust system and outside air strategies.

### 1.10 DEFERRED TESTING

- A. Unforeseen Deferred Tests. If the Contractor determines that any check or test cannot be completed due to the building structure, required occupancy condition or other deficiency, execution of checklists and Functional Testing may be delayed upon approval of the CT DCS PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.
- **B. Seasonal Testing.** During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design intent) as specified in Division 23 shall be completed as part of this contract. The CxA shall coordinate this activity. Tests will be executed, documented and deficiencies corrected by the appropriate Subcontractors, with the Agency facilities staff and the CxA witnessing. Any final adjustments to the O&M manuals and as-built drawings due to the testing will be made.
- **C. Post Occupancy.** During the warranty period, following successful functional testing, the CxA will request trend data to be provided by the Automatic Temperature Controls Contractor to verify system persistence and to monitor system operation over an extended period of time and varying loads. Any deficiencies will be noted for contractor correction. The Cx Team will regroup 10 months into the warranty period to meet with the facilities and operations staff to document any warranty related issues and plans for resolution.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01 91 00

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### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

Section 312513- Erosion and Sedimentation Control Α.

#### 1.2 **SUMMARY**

Α. Furnish all labor, materials, equipment, and incidentals necessary to perform the following all earthwork to include but not limited to excavation, fill placement, and grading required to complete the work in accordance with the Contract Plans and Specifications.

#### 1.3 SITE ACCESS

Α. See site logistics plan

#### 1.4 **QUALITY ASSURANCE**

- Materials shall be tested using the following standards: Α.
  - 1. ASTM D 422: Standard Test Method for Particle-Size Analyses of Soils with Hydrometer
  - 2. ASTM D 1557: Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
  - 3. ASTM D 2487: Standard Test Method for Classification of Soils for Engineering Purposes.
  - 4. ASTM D 2922/3017: In-Field Moisture Density Tests
  - 5. ASTM D 4318: Standard Test for Liquid Limit, Plastic Limit and Plasticity Index of Soils

#### Soil Testing and Inspection Service В.

- 1. Soil tests as required to determine compliance with this Specification shall be provided by the Contractor.
- In areas where compaction is not found to comply with Contract Documents, fill 2. material shall be recompacted or removed and replaced in accordance with specified densities and moisture contents. Corrected areas shall be retested at no additional cost to the Owner.
- 3. The Contractor shall maintain sufficient reference points to provide vertical and horizontal locations of soil tests.

#### 1.5 **SUBMITTALS**

#### Α. **Product Data:**

Each type of warning tape listed in paragraph 2.2.B.

CT DAS - 5000 PROJECT NO.: BI-CTC-467 B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated.

#### All Fill Materials 1.

- Classification according to ASTM D 2487, prior to delivery to the site and a. one per 2,000 CY delivered.
- Gradation analysis according to ASTM D 422 (without hydrometer), prior to b. delivery to the site and one per 2,000 CY delivered.
- Laboratory compaction test results according to ASTM D 1557, prior to C. delivery to the site and one per 2,000 CY delivered.

# PART 2 - PRODUCTS

#### 2.1 **MATERIALS**

Α. General Fill to be used for general raises in grade shall be free from ice, snow, roots, sod, rubbish, and other deleterious or organic matter. It shall be graded within the following limits:

U.S. STANDARD SIEVE SIZE	PERCENT FINER BY WEIGHT
3-inch	100
No. 10	30-90
No. 40	10-70
No. 200	0-20

- B. Structural Fill to be used for fill within the upper 3 feet of fill beneath footings and structure slabs, and as a base course beneath bituminous asphalt concrete shall meet the requirements of Section M.02.03, Grading "C" of Form 816, State of Connecticut DOT Standard Specifications for Roads, Bridges, and Incidental Construction. Gravel shall be free from ice and snow, roots, sod, rubbish, and other deleterious or organic matter.
- Asphalt millings may be used as a substitute for gravel in the gravel road and shall C. conform to the requirements or Article M.04.01, Reclaimed Asphalt Pavement, of Form 816.

#### 2.2 ACCESSORIES

- Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape Α. manufactured for marking and identifying underground utilities, minimum 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep.
- Identifying Colors for Utilities: В.

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- 1. Red: Electric.
- 2. Yellow: Gas, oil, steam, and dangerous materials.
- 3. Orange: Telephone and other communications.
- 4. Blue: Water systems.
- 5. Green: Sewer systems.

### PART 3 - EXECUTION

# 3.1 UNAUTHORIZED EXCAVATION

A. If unauthorized excavation is performed beyond the limits shown on the Plans or the limits directed by the Engineer, it shall be backfilled at the Contractor's expense with material satisfactory to the Engineer and compacted in accordance with provisions in this section.

## 3.2 SUBGRADE PREPARATION

- A. Prior to fill placement, the subgrade should be compact, dry, and free from debris, ice, and snow. Fill placement will not be allowed over frozen subgrade.
- B. Subgrade preparation should be followed immediately by fill placement, or the intended construction. Deterioration of the subgrade between excavation and initial fill placement shall be the responsibility of the Contractor and shall be repaired at the Contractor's expense.
- C. All subgrades must be inspected by the Engineer prior to fill placement. Sufficient time must be given to the Engineer to inspect and perform any necessary tests on the subgrade.
- D. If in the opinion of the Engineer, the subgrade becomes disturbed, the material shall be recompacted if conditions permit, or excavated and replaced with compacted suitable material as ordered by the Engineer.

# 3.3 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
- C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.
  - 1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

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3.4 Stockpile borrow materials and satisfactory excavated soil materials in locations indicated on the Plans. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Prevent windblown dust. Provide erosion control measures. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

## 3.5 FILL PLACEMENT

- A. Delivery and compaction of fill material shall be made during the presence of the Engineer's representative and shall be subject to his approval. This inspection by no means absolves the Contractor from responsibility to properly compact the fill as specified.
- B. Fill shall be placed in a continuous manner. Deterioration of fill surfaces due to freezing and thawing, precipitation, excessive drying, etc. shall be repaired by and at the expense of the Contractor to the satisfaction of the Engineer prior to placement of additional fill materials.
- C. Maximum loose lift thickness of fill during placement is not to exceed 12 inches, unless otherwise noted.
- D. All fill shall be placed "in the dry." The fill areas shall be graded to drain and provide a smooth surface which will readily shed water.
- E. Fill placement shall not be allowed on top of frozen ground or during weather conditions which do not allow for proper moisture and density controls.

## 3.6 FILL COMPACTION CRITERIA

- A. Fill that is too wet for proper compaction shall be disced, harrowed, or otherwise dried to proper moisture content for compaction to the required density.
- B. Fill that is too dry for proper compaction shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow for compaction to the required density.
- C. The Engineer's presence does not include supervision or direction of the actual work by the Contractor, his employees, or agents. Neither the presence of the Engineer nor any observations and testing performed by him shall excuse the Contractor from defects discovered in his work.
- D. The degree of compaction shall be based on a maximum dry density as determined by ASTM Specification D-1557. The degree of compaction required, unless otherwise noted on the Plans or directed and approved by the Engineer, shall be a minimum percent of the maximum dry density as follows.

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Minimum Compaction Requirements			
Proposed improvement areas	Percent of Maximum Dry Density (ASTM D 1557)		
Structural fill below footings and approach and structure slabs	95		
General Fill for raises in grade beneath structures	92		
Backfill within landscaped areas	85		

- E. Tests will be performed at the following frequencies:
  - 1. For each compacted fill layer, a minimum of one compaction test for every 2,000 square feet.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, recompact and retest until specified compaction is obtained.

#### 3.7 FIELD QUALITY CONTROL

- Testing Agency: Engage a qualified independent geotechnical engineering testing Α. agency to perform field quality-control testing.
- B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.
- C. Testing agency will test compaction of soils in place according to ASTM D 6938. Tests will be performed at the following locations and frequencies:
  - 1. At least one test for every 2,000 square feet per lift of prepared subgrade, or as directed by the Engineer.
  - Backfill around Structures: At each compacted backfill layer, at least one test for 2. each 25 feet or less of structure length, but no fewer than two tests.
  - Trench Backfill: At each compacted initial and final backfill layer, at least one test for each 100 feet or less of trench length, but no fewer than two tests.
- D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

#### 3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Waste Material: Remove waste material, including unsuitable soil, trash, and debris, and legally dispose of it off Owner's property.

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- B. Excess Soil Material: Stockpile excess soil for disposal. Prior to disposal, perform screening level physical and chemical testing for purposes of determining acceptable disposition of the soil.
  - a. Perform screening level testing for the following parameters: arsenic, cadmium, chromium, mercury, lead, nickel, zinc, PAHs, PCBs, EPH, VOCs, TOC, and Grain Size.
  - b. Screening level testing shall be performed by obtaining composite samples from 3 separate points in each stock pile. Sampling should be performed at a frequency of at least one 3-point composite sample per 500 cubic yards of excess soil.
  - c. Report test results to the Project Manager from the State of Connecticut Department of Administrative Services for recommendations on disposal of the material if it is found to be contaminated. Additional testing may be necessary depending on the testing requirements of individual disposal facilities.

**END OF SECTION** 

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### PART 1 – GENERAL

## 1.01 DESCRIPTION OF WORK

- A. All labor, material and equipment necessary to complete all phases of demolition work as shown on the Drawings, as specified, and as can be reasonably implied from Drawings, Specifications, and field conditions.
- B. Filling of depressions resulting from demolition activities.
- C. Removal of utilities, drainage structures, drainage piping, pavement, handrails, sidewalks, and curbing.
- D. Removal and disposal of resulting demolition materials.
- E. Leaving site clean and ready for clearing required to install new construction.
- F. Maintaining streets and walks during demolition and the cleaning of them of debris resulting from demolition.
- G. Temporary shoring, bracing and framing where necessary for demolition work.
- H. Protecting adjoining construction that is to remain.
- I. Patching required as a result of demolition.
- J. Securing and maintaining in force the required permits and the payment of associated fees.
- Complying with all regulations for street and walk access and protection and fire access.

## 1.02 JOB CONDITIONS

## A. Traffic:

- 1. Conduct demolition operations and the removal of debris in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities;
- 2. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction;

- 3. Provide alternate, adequately signed, routes around closed or obstructed traffic ways.
- 4. Ensure the safe passage of persons around the area of demolition;
- B. Conduct operations to buildings, to prevent damage or injury to adjacent buildings, structures, other facilities and persons;
- C. Provide shoring, underpinning, excavation supports as necessary to protect structures and all adjacent properties;
- D. If applicable, provide and maintain fire protection.
- E. Promptly repair damages, to adjacent facilities caused by demolition operations. Replace glass breakage immediately.
- F. Maintain existing utilities not scheduled to be removed, keep in service, and protect against damage during demolition operations;
  - 1. Repair and, if necessary replace, services damaged as result of demolition:
  - 2. Do not interrupt existing utilities if encountered serving occupied or used facilities, except when authorized in writing by authorities;
  - 3. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities;
  - 4. The contractor shall arrange for any utility shut-offs required. The Contractor shall disconnect and seal utilities before starting demolition operations. Construction related work required by the Utility Companies is included in this Contract. Do not start demolition work until utility disconnections have been completed and verified in writing.

# B. Protection:

1. Erect barriers, fences, guard rails, enclosures, chutes, and shoring to protect personnel, structures, and utilities remaining intact.

## PART 2 - PRODUCTS

2.01 None required by this Section.

## PART 3 - EXECUTION

### 3.01 EXISTING STRUCTURES AND RELATED FACILITIES

- A. Perform the demolition and removal of demolition debris in accordance with the Drawings and the submitted and approved site demolition plan.
- B. All existing and temporary fences (when no longer required to protect and secure the construction site), structures of any character not necessary to the construction of the work shall be removed by the Contractor and disposed of to the satisfaction of the Engineer.
- C. Protect existing utilities, and other improvements that are not designated to be demolished. Provide and maintain all required temporary construction and facilities for the support and protection of the existing structures to remain. Restore damaged improvements not intended to be demolished.
- D. Abandoned existing below grade utilities, site utility structures, and appurtenances within the existing building and structure footprints shall not be left in place. Abandonment of in-place existing underground utilities, site utility structures, and appurtenances within these limits shall have prior approval from Engineer. Other utility lines abandoned in place shall be appropriately plugged and capped to prevent migration of soil or water.
- E. If Contractor's operation is in interference with any fences outside of the demolition limits, Contractor shall be responsible for notifying the Engineer and shall obtain approval prior to any temporary fence relocation. The cost of relocation shall be incidental to the contract and at no cost to the Owner.

# 3.02 CURB AND GUTTER, PAVEMENT, AND CONCRETE WALKWAYS

- A. Perform the demolition and removal of demolition debris in accordance with the submitted and approved plan.
- B. Saw-cut and remove curb and gutter, pavement, and concrete walkways as needed in performance of this work.

# 3.03 BACKFILL OF DEMOLITION EXCAVATIONS

A. Excavations created by demolition activities shall be backfilled in the same manner as excavations created for the location of existing underground utilities as set forth in Section 31 00 00, Site Earthwork.

# 3.04 MAINTENANCE OF TRAFFIC, ACCESS, AND UTILITIES

- A. Do not interfere with the use of or access to adjacent right-of-ways, buildings or property while work is in progress.
- B. Do not close or otherwise obstruct tracks or roads without obtaining the City written permission.
- C. Maintain accessibility at all times to fire hydrants within the construction area.
- D. Ensure that utilities serving adjacent buildings remain in service.
- E. Do not remove lines or services of public utility companies. Where removal or relocation of such lines is required, make all necessary arrangements with the utility company involved.
- F. Coordinate with utility companies involved for shut-off of services if lines are active.
- G. Conduct operations with minimum interference to pedestrian and vehicular access. Maintain and protect egress and access at all times.

## 3.05 PROTECTION OF EXISTING PROPERTY AND IMPROVEMENTS

- A. Where on-site lines are shown on the Drawings to remain, protect and maintain such lines from damage.
- B. Protect from damage buildings, appurtenances, utilities, and site utility structures that are adjacent to demolition work.
- C. Erect and maintain temporary bracing, shoring, lights, barricades, and warning signs as necessary to protect roads, tracks, and improvements from damage, including settlement.
- D. Provide adequate shoring to protect the mainline within project limits during execution and/or removal and reconstruction of utilities or drainage systems.
- E. Conduct demolition activities so as to minimize interference with adjacent appurtenances, utilities, structures, site utility structures, and occupancies.
- F. Cease operations immediately if existing utilities, structures, or site utility structures appear to be in danger. Notify Engineer immediately. Do not resume operations until directed in writing by the Engineer.
- G. Restore structures and improvements within and adjacent to demolition to conditions prior to the start of work.

# 3.08 DEMOLITION ACTIVITIES

- A. Sawcut at the limits of existing pavement and other surfaces to be removed where indicated on drawings.
- B. Backfill excavations caused as a result of demolition work. Backfill material shall be as specified in Section 31 00 00, Earthwork.
- C. Grade and compact areas affected by demolition work.
- D. Where abandoned pipes and conduits are permitted to be left in place, cap or plug pipes and conduits.
- E. Proceed with dewatering procedures only after approval of dewatering plan.

**END OF SECTION** 



## PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the selective demolition and alteration work as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Alterations, selective demolition and removals as noted on drawings and as required to accommodate new construction.

- 2. Removal of debris.
- 3. Protection of existing building and spaces to remain.
- 4. Protection of existing curbs and sidewalks.
- 5. Temporary coverage passageways.
- 6. Alterations, selective demolition and removals of exterior façade, where noted.
- 7. Patching and refinishing of existing surfaces damaged as a result of this work.
- 8. Protection.

### 1.3 QUALITY ASSURANCE

- A. The Contractor shall comply with the requirements of all applicable Federal, State and local safety and health regulations regarding the demolition of structures including ANSI/NFPD 241-Building Construction and Demolition Operations.
- B. The Contractor shall be responsible for any damage to any adjacent structures or buildings to remain.
- C. Qualifications: Qualifications of Contractor for work of this Section shall not be less than ten (10) years of field experience in work of this nature.
- D. Professional Engineering: The Contractor shall retain the services of a Professional Engineer licensed in the State of Connecticut, who shall design and supervise installation of all underpinning and shoring.

# 1.4 RELATED SECTIONS

A. Alteration and removal requirements for mechanical and electrical work - Mechanical and Electrical Sections.

## 1.5 SUBMITTALS

- A. Schedule of Demolition Operations: Submit demolition procedures and operational sequence for Architect's review prior to start of work. Submit a written request to Architect well in advance of executing any cutting or alteration which affects:
  - 1. The work of tying in or connecting to operational systems of the building, including electrical, mechanical and security systems.
  - 2. The work of the Owner or any separate Contractor.
  - 3. The structural value or integrity of any element of the project or of adjacent structures.

- 4. The integrity or effectiveness of weather-exposed and moisture-resistant elements or systems.
- 5. The efficiency, operational life, maintenance, or safety of operational elements or systems.
- B. Notice of Differing Conditions: Submit a written notification if, during the work of demolition and cutting, conditions are discovered which significantly vary from those shown on the drawings. Do not commence work until approval of Architect.
- C. Shop Drawings: Submit the following prior to starting work:
  - 1. Submit for Architect's information shop drawings indicating location and typical construction details of temporary dustproof and weatherproof partitions.
  - 2. Submit drawings of temporary structural shoring, bracing, framing or support, for the information of the Architect. Such drawings will be reviewed by the Structural Engineer for the effects of such temporary members on the structural elements to remain. These drawings shall include the reason for such temporary members, the location, the direction and magnitude of design reaction forces on existing structure, and details showing how these reaction forces will be applied to the existing structure.
    - a. Shop drawings shall be submitted with the Seal of the P.E. engaged by Contractor; P.E. must be licensed in the State of Connecticut.
    - b. The Architect will receive acknowledgment for concepts shown. Such acknowledgments shall be of the concept only and not of actual capacities or structural design and shall not in any way diminish or limit the Contractor's responsibility for the quality and performance of the work and for protecting existing structures and facilities.

## 1.6 SPECIAL PRECAUTION

A. Hazardous materials may be encountered during demolition operations including asbestos; comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

# 1.7 JOB CONDITIONS

## A. Condition of Structure

 The Contractor for the work of this Section shall be held to have visited the site, examined the premises, determined for himself the existing conditions, character of equipment and facilities needed for the performance of the work, and all matters which may in any way affect the work before submitting a bid.

- a. Information regarding existing construction or conditions is based on available record drawings which may or may not truly reflect existing conditions. Such information is included on the assumption that it may be of interest to the Contractor, but the Architect, Owner and their consultants do not assume responsibility for its accuracy or completeness.
- b. Notify the Architect if, during the course of demolition, conditions are discovered which significantly vary from those shown on the drawings. Do not proceed until authorized by Architect.
- The Contractor shall accept the condition of the site and structures as found. The Architect and Owner assume no responsibility for condition of site or structures nor the continuation of the condition existing at time of bidding or thereafter.
- B. Areas of building to be demolished or altered will be vacated and discontinued in use prior to the start of the work.

## C. Partial Removal

- 1. Items of savable value to the Contractor may be removed from the structure as the work progresses. Salvaged items must be transported from the site as they are removed.
- 2. Storage or sale of removed items on the site will not be permitted.
- D. Explosives: The use of explosives will not be permitted.

## E. Traffic

- 1. Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.
- 2. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

# F. Utilities

- 1. Refer to Division 22 and 26 of the specifications for special requirements concerning utilities and services.
- 2. Maintain any existing utilities required to remain; keep in service and protect against damage during demolition operations.
- 3. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to the governing authorities.

4. Disconnect and seal any abandoned utilities before starting demolition operations. Coordinate all work with local utility companies having jurisdiction.

# 1.8 SCHEDULING

- A. Before commencing any alteration or demolition work, submit for review by the Architect, and approval of the Owner, a schedule showing the commencement, the order, and the completion dates for the various parts of this work. Trenching of existing slab-on-grade in preparation for burying new utilities lines must be preceded by coordination conference with trades utilizing the trench.
- B. Before starting any work relating to existing utilities (electrical, sewer, water, heat, gas, fire lines, etc.) that will temporarily discontinue or disrupt service to the structures to remain, notify the Architect and the Owner 7 days in advance and obtain the Owner's approval in writing before proceeding with this phase of the work.

### PART 2 PRODUCTS

Refer to Part 3 - Execution, for Product Requirements

## PART 3 EXECUTION

### 3.1 PROTECTION

- A. Take full precautions to protect workmen, passersby or any other persons from falling debris and other hazards of demolition operations.
- B. Execute demolition work to insure protection of existing portions of building to remain against damages which might occur from falling debris or other cause. Do not interfere with use of adjacent occupied buildings and areas. Maintain free, safe passage to and from occupied adjacent buildings.
- C. Materials Placement: Do not load structure with weight that will endanger, overload or cause excessive deflection of the existing structure, or that will damage finished surfaces adjacent to and/or supported by the existing structure, except portions being removed.
- D. Construction Operations: Do not employ any construction operation, equipment or vehicles that will endanger, overload or cause excessive deflection of the existing structure, or that will damage finished surfaces adjacent to and/or supported by the existing structure, except portions being removed.
- E. Take precautions to guard against movement, settlement, damage, or collapse of any part of building, sidewalks, adjacent property or street passages; be liable for any such movement, settlement or collapse. If such damage does accidentally occur, Contractor shall repair promptly at no cost to Owner.

- F. Provide the necessary safeguards to prevent accidents, to avoid all necessary hazards and protect the public, the work and property at all times, including Saturdays, Sundays, and holidays.
- G. Be responsible for any and all damages which may arise or occur to any party whatsoever by reason of the neglect in providing proper lights, guards, barriers, or any other safeguards to prevent damage to property, life and limb.
- H. Make such explorations and probes as are necessary to ascertain any required protective measures before proceeding with demolition and removal. Give particular attention to shoring and bracing requirements so as to prevent any damage to existing construction.
  - Provide interior and exterior shoring, bracing, or support to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain. The Contractor's Professional Engineer shall advise on bracing, shoring, underpinning, or other structural requirements. The Contractor shall bear all responsibility for prevention of movement or other structural fault.
  - 2. The Contractor shall restore, by repair or otherwise, the portions of structure or their contents altered by the Contractor in furtherance of his underpinning and support operations. Restoration shall be completed to the conditions which existed prior to the start of the work. Any damage caused by inadequate support shall also be restored by the Contractor at no cost to the Owner.
- I. Provide, erect and maintain catch platforms, lights, barriers, weather protection, warning signs, and other items as required for proper protection of the workmen engaged in demolition and alteration operations, occupants of the building, public and adjacent property. Any damage caused by the Contractor's operations shall be promptly repaired by the Contractor at no cost to the Owner.
- J. Provide and maintain temporary protection of the existing structure designated to remain where demolition, removal, and new work are being done, connections made, materials handled, or equipment moved.
- K. Take necessary precautions to prevent dust and dirt from rising. Protect unaltered portions of the existing building affected by the operations under this Section by dustproof partitions and other adequate means.
- L. Provide adequate fire protection in accordance with local Fire Department requirements.
- M. Do not close or obstruct walkways, passageways, or stairways. Do not store or place materials in passageways, stairs, or other means of egress. Conduct operations with minimum traffic interference.

- N. Be responsible for any damage to the existing structure or contents by reason of the insufficiency of protection provided.
- O. Erect temporary covered passageways at street level as required by authorities having jurisdiction.
- P. Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the Owner.
- Q. Provide and maintain weather protection at exterior openings so as to fully protect the interior premises against damage from the elements until such openings are closed by new construction.

## 3.2 INSPECTION

- A. Verify that areas of demolition work are protected and temporary dustproof partitions have been installed.
- B. Verify that construction to be removed is not load bearing or has been properly braced, framed or supported.
- C. Inspect existing conditions of the project, including elements subject to damage or to movement during demolition and cutting.
- D. After uncovering work, inspect the conditions affecting the installation or performance of the work.
  - 1. Report differing or questionable conditions to the Architect in writing; do not proceed with the work until the Architect has provided further instructions.

# 3.3 PREPARATION

- A. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work
- B. Provide devices and methods to protect other portions of the project from damage.
- C. Pollution Controls
  - 1. Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering in the air to the lowest practical level. Comply with governing regulations pertaining to environmental protection.
    - a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

- Clean adjacent structures and improvements of dust, dirt and debris caused by demolition operations. Return adjacent areas to condition existing prior to the start of the work.
- 3. Provide drainage for temporary water use.

# 3.4 DEMOLITION AND CUTTING

- A. Selectively demolish existing construction in conformance with the drawings and these specifications.
  - Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surface to receive installation of work by others and patching of finish surfaces.
  - 2. Do all cutting or removal so as to leave neat, true, plumb and square edges, at edges to remain. Use carborundum or diamond saw equipment for cutting masonry, concrete and stone work, where edges or surfaces are to remain.
  - 3. Do not cut or remove construction which might weaken or impair the structural integrity or strength of the structural framing or support systems which are to remain.
  - 4. Demolish and remove materials as shown on the drawings without damage to the remaining parts of the structure or mechanical/electrical/utility systems.
  - 5. Remove materials so as to not impose excessive loads in supporting walls, floors or framing and so as not to damage remaining undemolished portions of the structure.
  - 6. Where portions of structures are to be removed, remaining portions shall be protected from damage and prepared to fit new construction. Damage to portions of structures to remain shall be repaired.
  - 7. Reinforcing steel in existing structures shall be left in place, cleaned and aligned to provide tie with new work.
  - 8. Proceed with demolition in a systematic manner.
  - 9. Demolish concrete and masonry in small sections.
  - 10. Remove structural framing members and lower to ground by means of hoists, derricks, or other suitable methods.

### 3.5 SHORING AND BRACING

A. General

- Design, provide, erect and maintain necessary temporary shoring, bracing, framing, or support where load bearing structural or supporting members are removed or weakened by cuts or openings or are subject to damage from demolition operations, and otherwise as required for safety or to protect finish surfaces from damage.
- 2. Construction and adequacy of the shoring shall be the entire responsibility of the Contractor. Any damage caused by the inadequacy of the shoring or other support shall be the responsibility of the Contractor to remedy at no additional expense to the Owner.
- 3. Shoring and bracing shall remain until new structural framing and/or supports are installed. Coordinate operations fully with other trades.
- 4. Be ready at any time to promptly provide, add to, or strengthen temporary shoring, bracing, or support for existing work, in case existing construction begins to show signs of structural stress.

# 3.6 WORKMANSHIP STANDARDS FOR ALTERATION AND REMOVAL WORK

- A. Cut, remove, alter, temporarily remove and replace, or relocate existing work as required for performance of the work. Perform such work required with due care, including shoring and bracing.
- B. Coordinate patching involving the various trades whether or not specifically mentioned in the respective specification Sections.
- C. Materials or items demolished and not designated to become the property of the Owner or to be reinstalled shall become the property of the Contractor and shall be removed from the Owner's property.
- D. Execute the work in a careful and orderly manner, with the least possible disturbance to the public and to the occupants of the adjacent buildings.
- E. In general, demolish masonry in small sections. Where necessary to prevent collapse of any construction, install temporary shores, struts, or bracing.
- F. Materials to be removed by existing elevators shall be put in enclosed containers.
- G. Where existing equipment and/or fixtures are indicated to be reused, repair such equipment and/or fixtures and refinish to put in perfect working order. Refinish as directed.
- H. Cut out embedded anchorage and attachment items as required to properly provide for patching and repair of the respective finishes.
- I. Confine cutting of existing roof areas designated to remain to the limits required for the proper installation of the new work. Cut and fold back existing roofing. Cut and

remove insulation and related items. Provide temporary weathertight protection as required until new roofing and flashings are installed. Consult the Owner to ascertain if existing guarantee bonds are in force and execute the work so as not to invalidate such bonds.

- J. Where utilities are removed, relocated or abandoned, cap, valve, plug, or by-pass to make complete and working installation.
- K. Restore existing pipe and duct coverings damaged by work under this Contract to original undamaged condition.
- L. Immediately restore to service and repair any damage caused by Contractor's workmen to existing pipe and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems which are not scheduled for discontinuance or abandonment.
- M. Upon completion of contract, deliver work complete. Damage that may be caused by Contractor or Contractor's workmen to existing structures designated to remain, grounds, and utilities shall be repaired by Contractor and left in as good condition as existed prior to damaging.
- N. Restore finish work of floors, walls, and ceilings remaining in place but damaged or defaced because of demolition or alteration work to condition equal that which existed at beginning of work under this Contract.
- O. Where alteration or removals expose damaged or unfinished surfaces or materials, refinish such surfaces or materials, or remove them and provide new or salvaged materials to make continuous surfaces uniform.
- P. Perform new work and restore and refinish existing work in conformance with applicable requirements of the specifications, except as follows:
  - 1. Materials for use in repair of existing surfaces, but not otherwise specified, shall conform to the highest standards of the trade involved, and be in accordance with approved industry standards, and shall be as required to match existing surfaces.
  - 2. Workmanship for repair of existing materials shall, unless otherwise specified, be equal to similar workmanship existing in or adjacent to the space where the work is being done.
  - 3. Installation of salvaged items where no similar items exist shall be done in accordance with the highest standards of the trade involved and in accordance with approved shop drawings.
- Q. Materials or items designated to become the property of the Owner shall be as shown on the drawings. Remove such items with care and store them in a location at the site to be designated by the Owner.

- R. Materials or items designated to be reinstalled shall be as shown on the drawings. Remove such items with care under the supervision of the trade responsible for reinstallation; protect and store until required. Replace materials or items damaged in their removal with similar new material.
- S. The existing building shall not be used as a work shop. Neither shall the furnishings or equipment in any room be used as work benches. Should any damage occur during the progress of the work to any furniture, fixtures, equipment, or appurtenances therein, such damage shall be repaired, replaced or made good by the Contractor without extra cost to the Owner.
- T. Where removing existing floor finish and base, remove all adhesive and leave floors and walls smooth and flush, ready to receive new finish.
- U. Finish new and adjacent existing surfaces as specified for new work. Clean existing surfaces of dirt, grease and loose paint before refinishing.

# 3.7 DISPOSAL OF DEMOLISHED MATERIALS

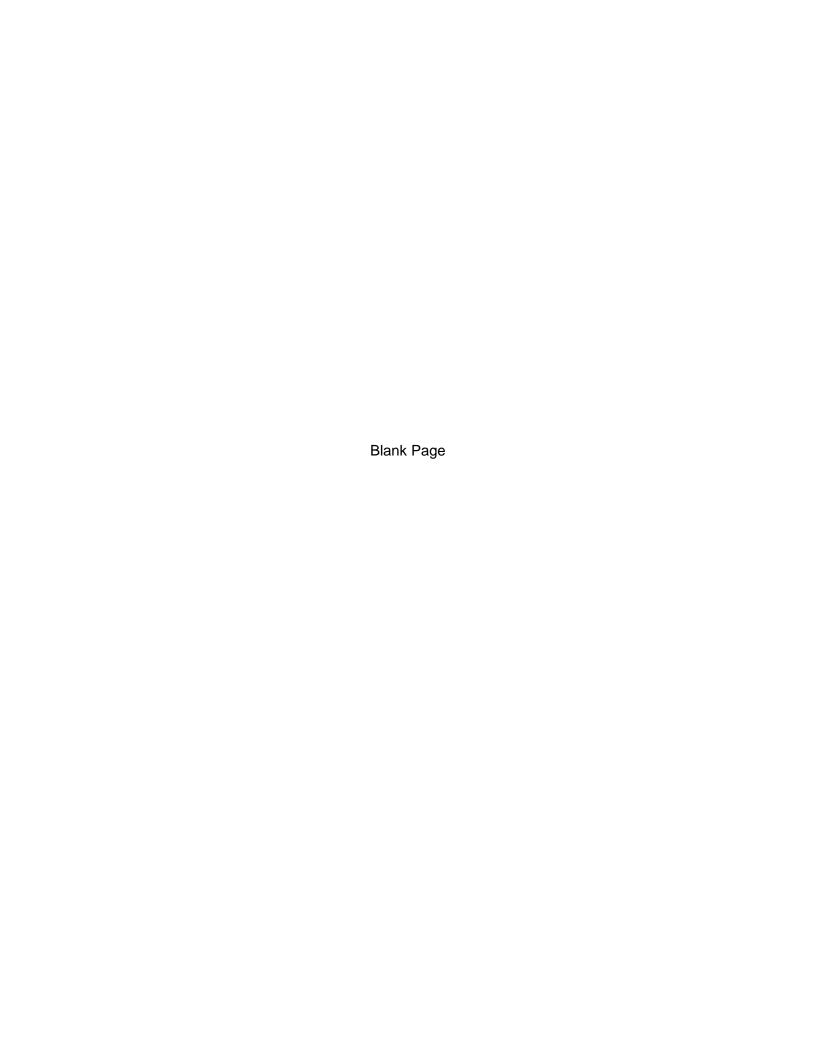
### A. General

- 1. Remove from the site debris, rubbish and other materials resulting from work of this Section.
- 2. Burning of removed materials from demolished structures will not be permitted on the site.
- B. Removal: Transport materials removed from demolished structures and legally dispose of off site. Pay any and all fees associated with disposal work. Leave the site in an orderly condition to the approval of the Architect.

## 3.8 CLEANING UP

A. Remove debris as the work progresses. Maintain existing premises in a neat and clean condition.

**END OF SECTION** 



#### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- A. General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.
- **B.** Fuss & O'Neill EnviroScience, LLC (EnviroScience) Limited Hazardous Building Materials Inspection Report (December 2016).
- C. Contract Considerations Section 01 20 00.
- **D.** Asbestos Roofing Abatement Section 02 82 14.
- E. Lead-Based Paint Awareness Section 02 83 19.
- F. Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury Section 02 84 16.
- **G.** Hazardous Materials Abatement Drawings HM-01 HM-04.

### 1.2 CONSULTANT

- A. The Owner shall retain a Consultant for the purposes of project management and monitoring during Asbestos Abatement activities. At the discretion of the Owner, the Consultant will represent the Owner Architect during the abatement project. The Asbestos Abatement Contractor (the "Contractor") will regard the Consultant's direction as authoritative and binding as provided herein, in matters particularly, but not limited to the following:
  - 1. Approval of work areas
  - 2. Review of monitoring results
  - 3. Completion of the various segments of work
  - 4. Final completion of the abatement
  - Submission of data
  - 6. Daily field punch list items
- **B.** The State of Connecticut-licensed Asbestos Consultant Project Designer for this project is Eduardo Miguel Marques (License No. 000312).

# 1.3 SCOPE OF WORK

- A. Work outlined in this Section includes all work necessary for the removal, packaging, transporting, and disposing of asbestos-containing materials (ACM) and Asbestos impacted during the Phase III Renovations and Additions Project (the "Work") at Norwalk Community College located at 188 Richards Avenue in Norwalk, Connecticut (the "Site"). This Work under this Contract includes, and is limited to asbestos abatement associated with the Work in the East Campus PepsiCo Theater and West Campus Student Center.
- **B.** This scope of work does not include the asbestos roofing abatement as identified the East Campus PepsiCo Theater and West Campus Student Center. See Section 02 82 14 Asbestos Roofing Abatement for additional information.
- C. This scope of work includes necessary selective demolition to access ACM scheduled for abatement.

#### 1.4 USE OF THE CONTRACT DOCUMENTS

A. It shall be incumbent upon the Contractor to visit the Site and determine what exists, its condition, and what will be required to accomplish the Work intended by the Contract Documents. No increase in the

Contract Sum will be permitted as a result of the Contractor's failure to visit the Site and understand the existing conditions.

- **B.** All work shall comply with the Contract Documents and with applicable codes, laws, regulations, and ordinances wherever applicable. The most stringent of all the foregoing shall govern the Work.
- **C.** It is not intended that the Specifications show every detail of the Work, but the Contractor shall be required to furnish within the Contract Sum all material and labor necessary for the completion of the Work in accordance with the intent of these Specifications.
- **D.** In case of ambiguity among the Contract documents, the more stringent requirement as determined by the Consultant shall prevail.
- **E.** The Work of this Contract includes making modifications as necessary, subject to approval by Owner in consultation with the Consultant to correct any conflicts.
- **F.** All items not specifically mentioned in the Specifications, but implied by trade practices to complete the Work, shall be included.

### 1.5 SITE EXAMINATION

- **A.** It is understood that the Contractor has examined the Site and made their own estimates of the facilities and difficulties attending the execution of the Work, and has based their price thereon.
- **B.** Except for unforeseeable concealed conditions as determined by the Consultant, the Contractor shall make no claim for additional cost due to the existing conditions at the Site.

### 1.6 CONTRACTOR QUALIFICATIONS

- **A.** All bidders shall submit a record of prior experience in asbestos abatement projects, listing no less than three completed projects in the past year, with all projects of similar size and scope. The Contractor shall list the experience and training of the project foremen and all on-site personnel. The information that should be included is as follows:
  - 1. Project Name and Address
  - 2. Owner's Name and Address
  - 3. Architect/Consultant
  - 4. Contract Amount
  - 5. Date of Completion
  - Extras and Changes
- **B.** The Contractor selected must appear on the approved list of Asbestos Abatement Contractors on file at the State of Connecticut Department of Public Health (CTDPH) and hold a valid license for asbestos abatement within the State of Connecticut.
- **C.** Submit a written statement regarding whether the Contractor has ever been cited for non-compliance with federal, state, or local asbestos and/or lead regulations pertaining to worker protection, removal, transport, or disposal.

### 1.7 TESTING LABORATORY SERVICES

**A.** The Contractor shall submit to the Consultant the name; address and qualifications of proposed laboratories intended to be utilized for sample analysis as required by this Section.

### 1.8 ADDITIONAL GENERAL REQUIREMENTS

**A.** The Contractor shall employ a competent CTDPH-licensed Asbestos Abatement Supervisor with at least three years of experience on projects of similar scope and magnitude who shall be responsible for all work involving asbestos abatement as described in the specifications and defined in applicable regulations, and

have full-time daily supervision of the same. The Supervisor shall be the competent person as defined by Occupational Safety and Health Administration (OSHA) regulations.

- **B.** If required by federal, state, local, and any other authorities having jurisdiction over such work, the Contractor shall allow the work of this contract to be inspected. The Contractor shall immediately notify the Owner, Architect, and Consultant and shall maintain written evidence of such inspection for review by the Owner, Architect, and Consultant.
- **C.** The Contractor shall incur the cost of all fines resulting from regulatory non-compliance as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance or negligence.
- **D.** The Contractor shall immediately notify the Owner, Architect, and Consultant of the delivery of all permits, licenses, certificates of inspection, of approval, or occupancy, etc., and any other such instruments required under codes by authorities having jurisdiction, regardless of who issued, and shall cause them to be displayed to the Owner, Architect, and Consultant for verification and recording.

#### 1.9 PROJECT DESCRIPTION

- **A.** The base bid includes the removal, packaging, transporting, and disposing of all ACM as identified herein conducted by workers meeting the requirements of OSHA Title 29 CFR, Part 1926.1101 for Class 1 and 2 work. This shall include all necessary demolition to access the ACM for abatement.
- **B.** Materials as discovered outside of those listed will be measured and paid or credited by unit prices. The quantities are estimates only and should be verified by the Contractor.
- **C.** The base bid includes the following ACM:

### **BASE BID - ASBESTOS**

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES			
East Campus PepsiCo Theater						
Theatre Roof	Gray/Black Roof Drain Caulking	4 Drains/4 LF	1			
See Section 02 82 14 Asbestos Roofing Abatement for additional information						
West Campus Student Center						
Kitchen, Faculty Lounge, Dining Hall, Corridor at Dining Hall, Mail Room, and Bathrooms (Material is assumed to exist above fixed ceilings, behind walls, and within wet walls and pipe chases)	Pipe Fitting Insulation	100 EA	1, 2			
Faculty Lounge W229, Kitchen Service Area, Dining Hall, Mail Room 119, and Adjacent Corridor	Black Floor Tile Mastic (associated floor tile is considered contaminated ACM)	6,500 SF	1, 3			
Behind Panel within Kitchen Walk-in Cooler	Gray Rough Coat Plaster	320 SF	1, 4			
2nd Floor Men's and Women's Bathrooms	Mirror Glue	6 EA	1, 5			
Exterior Window Systems	Gray Bottom Exterior Window Caulking		1, 6			
Exterior Window Systems	Tan Exterior Window Caulking (inseparable gray caulking is <1% ACM and considered contaminated ACM)	180 Windows 360 LF of caulking	1, 6			
Exterior Window Systems	Gray Interior/Exterior Window Glazing		1, 6			
Exterior Brick	Gray Expansion Wall Caulking	100 LF	1, 7			
Exterior Door Systems	Gray Exterior Door Caulking	2 EA (40 LF)	1, 8			
Exterior Brick and Concrete Foundation	Gray Exterior Foundation Caulking	260 LF	1, 7			

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY	NOTES
Upper Roof System	Gray Cementitious Soffit Paneling	200 SF	1, 9
Upper Roof and Exterior Window System outside 2nd Floor Corridor	Tan Caulking on Metal Fascia	30 LF	1, 10
Kitchen and associated Storage Rooms	Vapor Barrier under Concrete Flooring	2,110 SF	1, 11
2 <sup>nd</sup> Floor: Women's Room, Toilet , Janitor's Closet, Faculty Lounge, and Men's Room	Vapor Barrier under Concrete Flooring	915 SF	1, 11

### General Notes:

- Quantities shall be verified by Contractor during the time of the walk-through. Discrepancies of amounts and/or locations of asbestos-containing materials shall be addressed prior to bidding the work to the Owner and Consultant.
- 2. Pipe and pipe fitting insulation is assumed to exist in chases and behind walls and ceilings. The abatement contractor is responsible for selective demolition in areas of renovation in order to trace asbestos insulated pipes and fittings for proper removal and disposal as ACM.
- 3. All materials associated with the floor tile and mastic shall be removed and disposed of as asbestos, including, but not limited to, adhesives, leveling compounds, concrete toppings, etc.
- 4. Selective demolition of walk-in-cooler panel is required to access this material.
- 5. The entire window unit (including caulking and glazing compounds may include multiple layers/applications of caulking/glazing compounds) shall be removed and disposed of as asbestos.
- 6. Glue was presumed to exist behind the mirrors in the bathrooms identified. If present, this material shall be treated as ACM until sample results prove otherwise.
- 7. Gray expansion wall and foundation caulking shall be removed from between joints and masonry. All caulk shall be removed using wet methods for proper disposal.
- 8. Door caulking shall be removed from between frame/joints and masonry. All caulk shall be removed using wet methods for proper disposal.
- 9. Care shall be taken to remove the cementitious soffit paneling intact.
- 10. Caulking shall be removed from fascia using wet methods for proper disposal.
- 11. Vapor barrier under concrete flooring is presumed to be ACM and to exist under concrete flooring. This material is anticipated to be impacted during renovation activities.
- **D.** Some of the Work will be performed in multiple mobilizations, at different periods of time, in conjunction with other trades (i.e., other trades work, demolition work, etc.).
- **E.** Safety Data Sheets (SDS) for chemicals to be used during the project must be submitted to the Consultant prior to site delivery.
  - 1. Encapsulants applied to any surface that will receive a new finish that requires an adhesive must be compatible with the application of the new finish.
- **F.** The Contractor shall be responsible for providing temporary water, power, and heat as needed at the Site to perform the work required. Temporary lighting within the work areas must be connected to Ground Fault Circuit Interrupter (GFCI) power panels installed by a State of Connecticut-licensed electrician, permitted as required, and located outside of the work areas.

# 1.10 DEFINITIONS

- **A.** The following definitions relative to asbestos abatement apply:
  - Abatement: Procedures to control fiber release from ACM; includes removal, encapsulation, and enclosure.
  - 2. <u>Air Monitoring</u>: The process of measuring the total airborne fiber concentration of an area, or a
  - 3. <u>Amended Water</u>: Water to which a surfactant (wetting agent) has been added.
  - 4. <u>Architect</u>: a person or firm professionally engaged in the design of certain large constructions other than buildings and the like.

- 5. <u>Asbestos</u>: The name given to a number of naturally occurring fibrous silicates. This includes the serpentine forms and the amphiboles, and includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, or any of these forms, which have been chemically-altered.
- 6. <u>Asbestos Felt</u>: A product made by saturating felted asbestos with asphalt, or other suitable bindery, such as a synthetic elastomer.
- 7. <u>Asbestos Fibers</u>: Those particles with a length greater than five (5) microns and a length to diameter ratio of 3:1 or greater.
- 8. <u>Asbestos Project Designer</u>: The State of Connecticut-licensed Asbestos Consultant Project Designer for this project is Eduardo Miguel Margues (License No. 000312).
- 9. <u>Asbestos Work Area</u>: A regulated area as defined by OSHA Title 29 CFR, Part 1926.1101 where asbestos abatement operations are performed, which is isolated by physical barriers to prevent the spread of asbestos dust, fibers, or debris. The regulated area shall comply with requirements of regulated area for demarcation, access, respirators, prohibited activities, competent persons and exposure assessments and monitoring.
- Caulking: Resilient mastic compound often having a silicone bituminous or rubber base; used to seal cracks, fill joints, and prevent leakage. Typical applications: around windows, and doors. Caulking is at joints between two dissimilar materials. (i.e., masonry to wood, masonry to steel).
- 11. <u>Clean Room</u>: An uncontaminated area or room, which is a part of the worker decontamination enclosure with provisions for storage of worker street clothes and protective equipment.
- 12. <u>Clearance Sampling</u>: Final air sampling performed aggressively after the completion of the abatement project in a regulated area. Air samples collected by the air sampling professional having a total airborne fiber concentration of less than 0.010 fibers per cubic centimeter of air (fibers/cc) in each of five (5) samples collected inside the containment will denote acceptable clearance sampling by Phase Contrast Microscopy (PCM), or five air samples collected inside the containment by the air sampling professional having an average asbestos concentration of less than 70 structures per square millimeter (s/mm2) of air will denote acceptable clearance sampling for Transmission Electron Microscopy (TEM).
- 13. Competent Person: As defined by OSHA Title 29 CFR, Part 1926.1101, a representative of the Abatement Contractor who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure. The Competent Person has authority to take prompt corrective measures, and to eliminate such hazards during asbestos removal. The Competent Person shall be properly trained in accordance with EPA's Model Accreditation Plan (MAP).
- 14. <u>Consultant:</u> Fuss & O'Neill EnviroScience, LLC: A company retained by the Owner with State of Connecticut-licensed asbestos designer and asbestos project monitors to provide services enumerated in this section during asbestos abatement.
- 15. <u>Containment:</u> An enclosure within the building which establishes a contaminated area and surrounds the location where ACM and/or other toxic or hazardous substance removal is conducted, and establishes a Control Work Area.
- 16. <u>Curtained Doorway</u>: A device to allow ingress and egress from one area to another while permitting minimal air movement between the areas. Two curtained doorways spaced a minimum of six feet apart can form an airlock.
- 17. <u>Dampproofing:</u> Application of a water impervious material to surface (such as a wall) to prevent penetration of moisture, typically at foundation or below grade surface.
- 18. <u>Decontamination Enclosure System</u>: A series of connected areas, with curtained doorways between any two adjacent areas, for the decontamination of workers and equipment. A decontamination enclosure system always contains at least one airlock and is adjacent and connected to the regulated area, where possible.
- 19. <u>Encapsulant</u>: A liquid material which can be applied to ACM, which controls the possible release of asbestos fibers from the materials either by creating a membrane over the surface (bridging encapsulant), or penetrating the material and binding its components together (penetrating encapsulant).
- 20. <u>Equipment Room</u>: Any contaminated area or a room that is part of the worker decontamination enclosure with provisions for storage of contaminated clothing and equipment.
- 21. <u>Fixed Object</u>: Unit of equipment or furniture in the work areas that cannot be removed from the work area.
- 22. <u>Friable Asbestos Materials</u>: Any material that contains more than 1% asbestos by weight, that can be crumbled, pulverized or reduced to powder by hand pressure.
- 23. <u>Glazing Compound</u>: Any compound used to hold window glass in place, also referred to as putty, or glazier's putty. Is not field-applied, usually installed during manufacture of windows.
- 24. HEPA Filter: High Efficiency Particulate Air (HEPA) filter in compliance with ANSI Z9.2 1979.

- 25. <u>HEPA Vacuum Equipment</u>: Vacuum equipment fitted with a HEPA filter system for filtering the effluent air from the unit.
- 26. <u>Movable Object</u>: Unit of equipment of furniture in the work area that can be removed from the work area.
- 27. Negative Air Pressure Equipment: A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to adjacent unregulated areas), and capable of maintaining a constant, low velocity air flow into regulated areas from adjacent unregulated areas.
- 28. <u>NESHAPs</u>: National Emissions Standard for Hazardous Air Pollutants regulations enforced by the EPA.
- Owner: An employee or executive who has the principle responsibility for a process, program, or project.
- 30. Permissible Exposure Limit (PEL): The maximum total airborne fiber concentration to which an employee is allowed to be exposed. The new limit established by OSHA Title 29 CFR, Part 1926.1101 is 0.1 fibers per cubic centimeter (fibers/cc) as an eight (8)-hour time-weighted average (TWA), and 1.0 fibers/cc averaged over a sampling period of 30 minutes as an Excursion Limit. The Contractor shall be responsible for maintaining work areas in a manner that this standard is not exceeded.
- 31. <u>Project Monitor</u>: A professional capable of conducting air monitoring and analysis of schemes. This individual should be an industrial hygienist, an environmental scientist, or a Consultant with experience in asbestos air monitoring and worker protection equipment and procedures. This individual should have demonstrated proficiency in conducting air sample collection in accordance with OSHA Title 29 CFR. Parts 1910.1001 and 1926.1101.
- 32. RCRA: The Resource Conservation and Recovery Act (EPA Title 40 CFR, Parts 260 265).
- 33. Regulated Area: An area established by the employer to demarcate where Class I, II, and III asbestos work is conducted and any adjoining area where debris and waste from such asbestos work accumulate, and a work area within which total airborne fiber concentrations exceed, or there is a reasonable possibility that they may exceed the PEL.
- 34. Shower Room: A room between the clean room and the equipment room in the work decontamination enclosure with hot and cold running water and suitably arranged for employee showering during decontamination. The shower room is located in an airlock between the contaminated area and the clean area.
- 35. <u>Totally Enclosed Manner</u>: A manner that will ensure no exposure of human beings or the environment to a concentration of asbestos.
- 36. <u>Transport Vehicle</u>: A motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (e.g., trailer, railroad freight car) is a separate transport vehicle.
- 37. <u>Waterproofing</u>: Material, usually a membrane or applied compound (tar/mastic), used to make a surface impervious to water, includes concealed conditions (applications around doors, windows, and in wall cavities). Sometimes combined with felts.

#### 1.11 SUBMITTALS

- **A.** The Contractor shall submit the following to the Consultant in one complete package prior to the preconstruction meeting, and no later than 10 business days prior to the anticipated start of the Work:
  - 1. Submit copies of all notifications, permits, applications, licenses, and like documents required by federal, state, or local regulations obtained or submitted in proper fashion.
  - 2. Submit a schedule to the Owner/Architect and the Consultant that defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, decontamination, and final clearance air monitoring (if applicable).
  - 3. Submit the current valid State of Connecticut Asbestos Abatement Contractor license and certificate of insurance.
  - 4. Submit the name and address of the hauling contractor and landfill to be used. Also submit current valid operating permits and certificates of insurance for the transporter and landfill.
  - Submit the plans and construction details for the construction of the decontamination systems and the isolation of the work areas as may be necessary for compliance with this specification and applicable regulations.
  - 6. Submit the CTDPH license, training, medical, and respirator fit test records of each employee who may be on the Site.
  - 7. If the Contractor's CTDPH-licensed Asbestos Abatement Supervisor is not conducting OSHA-required employee exposure monitoring, submit the qualifications of the air sampling professional that the Contractor proposes to use for this project for this task.

- 8. Submit detailed product information on all materials and equipment proposed for asbestos abatement work on this project. This includes Material Safety Data Sheets (MSDS) on all products and chemicals that may be used on the project.
- 9. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project, as well as a list of past projects completed.
- 10. Submit a chain-of-command for the project.
- 11. Submit a site-specific Emergency Action Plan for the project. The Plan may include emergency procedures to be followed by Contractor personnel to evacuate the building, hospital name, phone number, and most direct transportation route from the Site, emergency telephone numbers, etc.
- 12. Submit a written site-specific Respiratory Protection Program for employees for the Work, including make, model and National Institute of Occupational Safety and Health (NIOSH) approval numbers of respirators to be used at the Site (if applicable).
- 13. Proposed electrical safeguards to be implemented by a qualified Electrical Contractor, including but not limited to: location of transformers, GFCI outlets, lighting, and power panels necessary to safely perform the project, including a description of electrical hazards and a safety plan for common practices in the work area. This may also include safety plan for temporary lighting, extension cord and other powered equipment used in the work area (locations, daily inspections, etc.).
- 14. Submit the proposed worker orientation plan that at a minimum includes a description of asbestos hazards and abatement methodologies, a review of worker protection requirements, and the outline of safety procedures.
- 15. No work on the Site will be allowed to begin until the Owner/Architect and the Consultant as listed herein approve the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation in a timely manner does not constitute a cause for change order or a time extension;
- **B.** The Contractor shall submit the following to the Consultant during the Work:
  - Copies of personal air sampling results (Consultant will not review or provide any direction or advice regarding results). The Contractor shall be responsible for proper sample analytical review and personal protective equipment (PPE) selection and use. Records are retained solely for project record.
  - 2. Copies of training, MADLS certifications, fit test records, and medical records for new employees to start work (24-hours in advance) and prior to the new employee arriving at the Site.
  - 3. Carbon copies from waste shipment record, waste manifest records, bill of lading, or other waste tracking record for all specified materials.
  - 4. Copies of daily log sheets, daily sign-in sheets, and containment sign-in sheets.
- **C.** The Contractor shall submit the following to the Consultant at the completion of the Work. The Owner reserves right to retain payment(s) until all items are received in completion:
  - Original final completed copies of the waste shipment records, signed by all transporters and the designated disposal site owner/operator.
  - Original final completed copies of bill of laden, weight tickets, recycling tickets, and manifests for all specified materials.
  - 3. Contractor's logs (daily activity logs, daily sign in sheets, containment sign-in sheets), and all worker training, medical records and respirator fit test records.
  - 4. Copies of all OSHA personal monitoring results.

### 1.12 REGULATIONS AND STANDARDS

- **A.** The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to asbestos abatement. Specifically, the Contractor shall comply with the requirements of the following:
  - 1. EPA National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Regulations (Title 40 CFR, Part 61, Subpart M);
  - 2. EPA Asbestos Hazards Emergency Response Act (AHERA) Regulations (Title 40 CFR, Part 763, Subpart E);
  - 3. OSHA Asbestos Regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101); and
  - 4. Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 180).
  - 5. Connecticut Department of Energy and Environmental Protection (CTDEEP) Regulations (Section 22a-209-8(i) and Section 22a-220 of the Connecticut General Statutes);

- CTDPH Standards for Asbestos Abatement (Sections 19a-332a-1 to 19a-332a-16);
- 7. CTDPH Licensing and Training Requirements for Persons Engaged in Asbestos Abatement and Asbestos Consultant Services (Sections 20-440-1 to 20-440-9 and Section 20-441);
- 8. 2003 International Building Code as adopted by the 2005 State of Connecticut Building Code including the 2009, 2011, 2013, and 2016 amendments;
- 9. Life Safety Code, National Fire Protection Association (NFPA);
- 10. Local health and safety codes, ordinances, or regulations pertaining to asbestos remediation and all national codes and standards including American Society of Testing and Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).

## 1.13 EXEMPTIONS

- **A.** Any deviations from these specifications require the written approval and authorization from the Owner and Consultant. Any deviations that may impact the bid cost shall be delineated with the bid for the Architect/Owner to review.
- **B.** Any modifications from the standard work practices identified in the CTDPH Standards for Asbestos Abatement, Sections 19a-332a-1 to 19a-332a-16 must be requested in writing and approved in writing by the CTDPH. The Consultant shall develop the Alternative Work Practice (AWP) application on behalf of the Owner. If the Contractor intends to request an AWP for this project, the nature of the AWP shall be disclosed in the bid documents and the cost savings associated with said AWP shall be provided for the Owner's consideration. An AWP shall not be filed without prior Owner's and Consultant's approval.

# 1.14 FINAL RE-OCCUPANCY AIR CLEARANCE

- **A.** Following the completion of the encapsulation phase of the work, the Consultant shall collect final reoccupancy clearance air samples inside the work area per CTDPH Standards for Asbestos Abatement (19a-332-1 to 19a-332-16).
- **B.** The Owner shall be responsible for payment of the sampling and analysis of the initial final air clearance samples only. The Contractor shall be responsible for payment of all costs associated with the collection and analysis of additional final clearance air samples if the first set of samples fail to satisfy the clearance criteria.
- **C.** Contractor shall not conduct demolition or other removal activities during final re-occupancy air clearance sampling.
- D. Exterior asbestos abatement work: Re-occupancy clearance air sampling is not required following removal of exterior non-friable ACM if removal does not render materials friable and negative pressure enclosures (NPEs) are not utilized. If removal renders non-friable materials friable, the Work must be performed within a NPE and final re-occupancy air clearance sampling will be conducted.

## 1.15 NOTIFICATIONS, POSTINGS, SUBMITTALS, AND PERMITS

- **A.** The Contractor shall make the following notifications, and provide the submittals to the following agency prior to the start of work. This notification is required ten (10) calendar days prior to the start of the abatement project.
  - Connecticut Department of Public Health 410 Capitol Avenue MS #51 AIR P.O. Box 340308 Hartford, CT 06134-0308
- **B.** The minimum information included in the notification to these agencies includes:
  - 1. Name and address of building Owner/Operator
  - 2. Building location
  - 3. Building size, age, and use
  - 4. Amount of asbestos to be removed
  - 5. Work schedule, including proposed start and completion date
  - 6. Asbestos removal procedures to be used

Name and location of disposal site for generated asbestos waste, residue, and debris

### 1.16 WORK SITE SAFETY PLAN

- **A.** The Contractor shall establish a set of emergency procedures and shall post them in a conspicuous place at the Site. The safety plan should include provisions for the following:
  - 1. Evacuation of injured workers.
  - 2. Emergency and fire exit routes from all work areas.
  - 3. Emergency first aid treatment.
  - 4. Local telephone numbers for emergency services including ambulance, fire, and police.
  - 5. A method to notify occupants of the building in the event of a fire or other emergency requiring evacuation of the building.
  - 6. The Contractor shall be responsible for training all workers in these procedures.

### 1.17 INDEPENDENT AIR SAMPLING AND ASBESTOS ABATEMENT MONITORING

- A. This Section describes independent air sampling work being performed on behalf of the Owner. This work is not in the Contract Sum. This Section describes air monitoring conducted by the Consultant to verify that the building beyond the work area and the outside environment remains uncontaminated. (Personal air monitoring required by OSHA is work to be performed by the Contractor and is within the Contract Sum). Negative exposure assessments will not be reviewed and/or approved by the Consultant. It shall be the Contractor's responsibility to determine its validity.
- B. The purpose of the Consultant's air monitoring is to verify proper engineering controls in the work area:
  - 1. Contamination of the building outside of the work area by airborne fibers.
  - 2. Failure of filtration or rupture in the differential pressure system.
  - 3. Contamination of air outside the building envelope by airborne fibers.
  - 4. Contamination of air outside a regulated work area by airborne asbestos fibers.
- **C.** Should any of the above occur, the Contractor shall immediately cease asbestos abatement activities until the fault is corrected. Do not recommence work until authorized by the Consultant.
- **D.** The Consultant may monitor total airborne fiber concentrations in the work area. The purpose of this air monitoring will be to detect total airborne fiber concentrations, which may challenge the ability of the Work Area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.
- **E.** To determine if the elevated total airborne fiber concentrations encountered during abatement operations have been reduced to an acceptable level, the Consultant will sample and analyze air in accordance with clearance air sampling requirements.
- F. The Consultant may perform on-site monitoring throughout the project, as follows:
  - 1. All work procedures shall be continuously monitored by the Consultant to assure that areas outside the designated work locations in the buildings will not be contaminated.
  - 2. Prior to work on any given day, the Contractor's designated "competent person" shall discuss the day's work schedule with the Consultant to evaluate job tasks with respect to safety procedures and requirements specified to prevent contamination of the building or the employees. This includes a visual work area inspection and the building or the employee decontamination. This includes a visual inspection of the work area and the decontamination enclosure systems.

# 1.18 CONTRACTOR'S AIR SAMPLING RESPONSIBILITY

- **A.** The Contractor shall independently retain an air sampling professional or the CTDPH-licensed Asbestos Abatement Supervisor shall monitor total airborne fiber concentrations in the worker breathing zones, and to establish conditions and work procedures for maintaining compliance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
- **B.** The Contractor's air sampling professional shall document all air sampling results and provide a report to the Consultant within 48-hours after sample collection.

**C.** All air sampling shall be conducted in accordance with methods described in OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.

## 1.19 PROPER WORKER PROTECTION

- **A.** This Section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards except for respiratory protection.
- **B.** All workers are to be accredited as Abatement Workers as required by the EPA AHERA Title 40 CFR, Parts 763 Appendix C to Subpart E, February 3, 1994.
- **C.** The Contractor is required to be certified and accredited as required by CTDPH.
- **D.** In accordance with OSHA Title 29 CFR, Part 1926, all workers shall receive a training course covering the dangers inherent in handling asbestos, the dangers of breathing asbestos dust, proper work procedures, and proper worker protective measures. This course must include, but is not limited to the following:
  - 1. Methods of recognizing asbestos
  - 2. Health effects associated with asbestos
  - 3. Relationship between smoking and asbestos in producing lung cancer
  - 4. Nature of operations that could result in exposure to asbestos
  - 5. Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:
    - a. Engineering controls
    - b. Work Practices
    - c. Respirators
    - d. Housekeeping procedures
    - e. Hygiene facilities
    - f. Protective clothing
    - g. Decontamination procedures
    - h. Emergency procedures
    - i. Waste disposal procedures
  - Purpose, proper use, fitting, instructions, and limitations of respirators as required by OSHA Title 29 CFR, Part 1910.134
  - 7. Appropriate work practices for the work
  - 8. Requirements of medical surveillance program
  - 9. Review of OSHA Title 29 CFR, Part 1926
  - 10. Pressure Differential Systems
  - 11. Work practices including hands on or on job training
  - 12. Personal Decontamination procedures
  - 13. Air monitoring, personal and area
- E. The Contractor shall provide medical examinations for all workers who may encounter a total airborne fiber concentration of 0.1 fibers/cc or greater for an 8-hour TWA. In the absence of specific airborne fiber data provide medical examinations for all workers who will enter the work area for any reason. Examination shall, at a minimum, meet OSHA requirements as set forth in Title 29 CFR, Part 1926. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.
- **F.** Submit the following to the Consultant for review. The Contractor shall not start work until these submittals are returned with Consultant action stamp indicating that they are approved.
  - Submit copies of certificates from an EPA approved AHERA Abatement Workers course for each worker as evidence that each asbestos Abatement Worker is accredited as required by the AHERA Regulation Title 40 CFR, Part 763 Appendix C to Subpart E, February 3, 1994.
  - Submit evidence that the Contractor is licensed to perform asbestos abatement work by the MADLS.
  - 3. Submit documents verifying that each worker has had a medical examination within the last 12 months as part of compliance with OSHA medical surveillance requirements. Submit, at a minimum, for each worker the following:
    - a. Name and Social Security Number (minimum last 4 digits)
    - b. Physician's written opinion from examining physician including at a minimum the following:

- 1) Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos.
- Any recommended limitations on the worker or on the use of PPE such as respirators.
- Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.
- 4. Copy of information that was provided to physician in compliance with OSHA Title 29 CFR, Part 1926.
- Statement that worker is able to wear and use the type of respiratory protection proposed for the project, and is able to work safely in an environment capable of producing heat stress in the worker.
- 6. Effective June 4, 2000, submit copies of certificates for the site supervisor and the workers issued by CTDPH.
- **G.** Submit certification signed by an officer of the abatement-contracting firm and notarized that exposure measurement, medical surveillance, and worker training records are being kept in conformance with OSHA Title 29 CFR, Part 1926.
- **H.** The Contractor shall maintain control of and be responsible for access to all work areas to ensure the following requirements:
  - 1. Non-essential personnel are prohibited from entering the area.
  - 2. All authorized personnel entering the work area shall read the "Worker Protection Procedures" that are posted at the entry points to the enclosure system, and shall be equipped with properly fitted respirators and protective clothing.
  - 3. All personnel who are exiting from the decontamination enclosure system shall be properly decontaminated
  - 4. Asbestos waste that is removed from the work area must be properly bagged and labeled in accordance with these Specifications. The surface of the bags shall be decontaminated. Asbestos waste removed from the NPE must be immediately transported off-site or immediately placed in locked, posted temporary storage on-site, and removed within 24-hours of the project conclusion.
  - Any material, equipment, or supplies that are removed from the decontamination enclosure system shall be thoroughly cleaned and decontaminated by wet cleaning and/or HEPA vacuuming of all surfaces.

## **PART 2 - PRODUCTS**

### 2.1 MATERIALS

- **A.** Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name and product technical description.
- **B.** Damaged or deteriorating materials shall not be used and shall be removed from the premises. Material that becomes contaminated with asbestos shall be decontaminated or disposed as asbestos waste.
- **C.** Polyethylene (poly) sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with factory label indicating 6-mil.
- **D.** Poly disposable bags shall be 6-mil with OSHA-required pre-printed label (29 CFR, Part 1926.1101(k)(8)(iii)). Tie wraps for bags shall be plastic, five-inches long (minimum), pointed and looped to secure filled plastic bags.
- E. Tape or adhesive spray will be capable of sealing joints in adjacent poly sheets and for attachment of poly sheet to finished or unfinished surfaces of dissimilar materials and capable of adhering under both dry and wet conditions, including use of amended water.

- **F.** Surfactant (wetting agent), shall consist of 50 percent polyoxyethylene ether and 50 percent polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of one ounce surfactant to five gallons of water or as directed by manufacturer.
- **G.** Removal encapsulant shall be non-flammable factory prepared penetrating chemical encapsulant deemed acceptable to Consultant. Usage shall be in accordance with manufacturer's printed technical data.
- **H.** The Contractor shall have available spray equipment capable of mixing wetting agent with water and capable of generating sufficient pressure and volume and having sufficient hose length to reach all areas with asbestos.
- I. Impermeable containers are to be used to received and retain any asbestos-containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with OSHA Title 29 CFR, Part 1926.1101(k)(8)(iii) [June 1, 2015 requirements]. Containers must be both air and watertight.
- **J.** Labels and signs, as required by OSHA Title 29 CFR, Part 1926.1101, will be used.
- **K.** Encapsulant shall be bridging or penetrating type which has been deemed acceptable to the Consultant. Usage shall be in accordance with manufacturer's printed technical data.
- L. HEPA filtered local exhaust ventilation shall be utilized during the installation of enclosures and supports where ACM may be disturbed.

#### 2.2 TOOLS AND EQUIPMENT

- **A.** The Contractor shall provide all clean tools and equipment necessary for asbestos removal, encapsulation, and enclosure.
- **B.** The Contractor's air monitoring professional or Abatement Supervisor shall have air-monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements. The equipment shall function properly, and air samples shall be calibrated with a recently calibrated (within 6 calendar months) rotometer.
- **C.** The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the job including protective clothing, respirators, filter cartridges, poly sheeting of proper size and thickness, tape and air filters.
- **D.** The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and electrical power sources (such as generators). Any electrical connection work affecting the building electrical power system shall be performed by a State of Connecticut-licensed electrician.
- **E.** The Contractor shall be responsible for coordinating electrical and water services and shall pay for these services for the duration of the project, if applicable.
- **F.** The Contractor shall assist the Consultant by providing necessary tools and equipment (e.g., coveralls, ladders, extension cords, lighting, etc.) for the Consultant to conduct inspections, final visual inspections, and final air clearance monitoring. The Consultant reserves the right to reject such items that are deemed unsafe and/or do not function properly and request items be replaced with adequate replacements. The work areas shall be safe to enter/occupy by the Consultant.
- **G.** The Contractor shall have available shower stalls and plumbing to support same to include sufficient hose length and drain system or an acceptable alternate.
- H. Exhaust air filtration system units shall contain HEPA filter(s) capable of sufficient air exhaust to create negative air pressure of -0.02 inches of water column within enclosure with respect to outside area. Digital monometers shall be supplied for Class 1 work. Equipment shall be checked for proper operation by smoke tubes or differential pressure gauge before the start of each shift and at least twice during the shift.

Adequate exhaust air shall be provided for a minimum of four (4) air changes per hour within the NPE. No air movement system or air filtering equipment shall discharge unfiltered air outside.

- Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter or larger.
- **J.** The Contractor will have reserve units so that the station system will operate continuously.

### **PART 3 - EXECUTION**

### 3.1 PRE-CONSTRUCTION MEETING

- **A.** At least one week prior to the start of work, a Pre-Construction meeting will be scheduled and must be attended by the Contractor and any Sub-Contractors. The assigned Contractor Site Supervisor must also attend this meeting.
- **B.** The Contractor shall present a detailed project schedule and project submittals at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and the Consultant will inform the Contractor of any scheduling adjustments for this project.
- **C.** Following the Pre-Construction meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

#### 3.2 WORK AREA PREPARATION FOR INTERIOR ABATEMENT

- A. Where necessary, deactivate electrical power, including receptacles and light fixtures. Under no circumstances during the decontamination procedures will lighting fixtures be permitted to be operating when amended water spray may contact the fixture. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All installations are to be made by a State of Connecticut-licensed electrician, permitted as required, and located outside the work areas.
- **B.** Temporary power shall be continuous power. Portable generators for use during asbestos abatement are not authorized.
- **C.** Deactivate and/or isolate heating, ventilating, and air conditioning (HVAC) air systems or zones to prevent contamination and fiber dispersal to other areas of the building or structure. During the work, vents within the work area shall be covered with two layers of 6-mil poly, and completely sealed with duct tape.
- D. The Contractor shall be responsible for removing furniture, equipment and any other materials to be salvaged from the work areas. Contractor shall be responsible for removing all solid waste within the work areas (if applicable). The Contractor shall pre-clean moveable objects within the proposed work areas using HEPA-filtered vacuum equipment and/or wet cleaning methods as appropriate and remove such objects from work areas. Non-porous materials (i.e., metal) shall be cleaned, visually inspected by a project monitor prior to removal from the work areas and recycling/disposal as solid waste.
- **E.** Completely seal all openings, including, but not limited to: windows, corridors, doorways, skylights, ducts, grills, diffusers, and any other penetration of the work areas, with poly sheeting a minimum of 6-mil thick, and sealed with duct tape. This includes doorways and corridors that will not be used for passage during work areas and occupied areas.
- **F.** Pre-clean fixed objects within the work areas, using HEPA vacuum equipment and/or wet cleaning methods as appropriate, and enclose with a minimum 6-mil poly sheeting completely sealed with duct tape.

- G. Clean the proposed work areas using HEPA vacuum equipment or wet cleaning methods as appropriate. Do not use methods that raise dust, such as dry sweeping or vacuuming with equipment not equipped with HEPA filters.
- **H.** After HEPA vacuum cleaning, cover fixed walls and floors.
- Maintain emergency and fire exits from the work areas, or establish alternate exits satisfactory to fire
  officials.
- J. Clean and remove ceiling mounted objects, such as lights and other items not sealed-off, which interfere with asbestos abatement. Use hand-held amended water spraying or HEPA vacuuming equipment during fixture removal to reduce settled fiber dispersal.
- **K.** Create pressure differential between work areas and uncontaminated areas by the use of acceptable negative air pressure equipment sufficient to provide four air changes per hour and create negative air pressure of -0.02 inches of water column within enclosure with respect to outside area as measured on a water gauge.

## 3.3 WORK AREA PREPARATION FOR EXTERIOR ABATEMENT

- A. Where necessary, deactivate electrical power, including receptacles and light fixtures. Under no circumstances during the decontamination procedures will lighting fixtures be permitted to be operating when amended water spray may contact the fixture. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All installations are to be made by a Commonwealth of Massachusetts-licensed electrician, permitted as required, and located outside the work areas.
- **B.** If applicable, temporary power must be continuous power. Portable generators for use during asbestos abatement shall not be permitted.
- **C.** Deactivate and/or isolate heating, ventilating, and air conditioning (HVAC) air systems or zones to prevent contamination and fiber dispersal to other areas of the structure. During the work, vents within the work area shall be covered with two layers of 6-mil poly and completely sealed with duct tape.
- **D.** Completely seal all openings, including, but not limited to: windows, corridors, doorways, skylights, ducts, grills, diffusers, and any other penetration of the work areas, with poly sheeting a minimum of 6-mil thick, and sealed with duct tape.
- **E.** Install ground cover consisting of one layer of six-mil poly, extending out a minimum of 15 feet from the building foundation in work. Tape and glue ground cover to the building foundation.

### 3.4 DECONTAMINATION SYSTEM

- **A.** The Contractor shall establish contiguous to the work area, a decontamination system consisting of equipment room, shower room, and clean room, in series. The only access between contaminated and uncontaminated areas shall be through this decontamination enclosure. If it is not feasible to erect a contiguous decontamination system, the Contractor shall establish a remote decontamination unit in as close proximity to the work area as is feasible. For exterior work, the Contractor shall establish a remote decontamination system at the perimeter of the regulated work area.
- **B.** Access between rooms in the decontamination system shall be through double-flap curtained openings. The clean room, shower and equipment room within the decontamination enclosure, shall be completely sealed ensuring that the sole source of airflow through this area originates from uncontaminated areas outside the work area.
- **C.** The Contractor shall establish contiguous with the work area an equipment decontamination enclosure consisting of two totally enclosed chambers divided by a double-flapped curtained opening. This enclosure must be constructed so as to ensure no personnel enter or exit through this unit.

- **D.** Occupied areas and/or building space not within the work areas shall be separated from asbestos abatement work areas by means of airtight barriers.
- **E.** Construct the decontamination enclosure system with wood or metal framing, cover both sides with a double layer of 6-mil poly sheeting, completely sealed with spray adhesive, and taped at the joints.
- **F.** If a Consultant is retained for pre-abatement services, the Contractor and the Consultant shall visually inspect barrier several times daily to assure effective seal and the Contractor shall repair defects immediately.

### 3.5 ASBESTOS REMOVAL PROCEDURE - GENERAL

- **A.** The Contractor shall have a designated "competent person" on the Site at all times to ensure establishment of a proper enclosure system and proper work practices throughout project.
- **B.** Abatement work will not commence until authorized by the Consultant.
- **C.** The Contractor shall properly coordinate abatement work with other trades, new construction and Site use. The Contractor shall be responsible for addressing any concerns by the Owner and/or Consultant.
- **D.** With a fine mist, spray ACM with amended water using airless spray equipment or apply approved removal wetting agent to reduce the release of fibers during removal operation.
- **E.** To maintain indoor asbestos concentrations to the minimum, the wet asbestos must be removed in manageable sections. Material drop shall not exceed eight feet. For heights up to 15-feet, provide inclined chutes or scaffolding to intercept drop.
- **F.** Remove ACM as appropriate by standard methods. Fill disposal containers as removal proceeds; seal filled containers and clean containers before removal to equipment decontamination enclosure system. Wet clean each container thoroughly, double bag and apply caution label. Ensure that workers do not exit the work area thorough the equipment decontamination enclosure.
- **G.** After completion of stripping work, all surfaces from which asbestos has been removed shall be wet brushed, using a nylon brush, wet wiped, and sponged or cleaned by an equivalent method to remove all visible material (wire brushes are prohibited). During this work, the surfaces being cleaned shall be kept wet
- **H.** Remove and containerize all visible accumulations of asbestos-containing and/or asbestos-contaminated debris. During cleanup, utilize brooms, rubber dustpan, and rubber squeegees to minimize damage to floor covering.
- I. Sealed disposal containers, and all equipment used in the work area, shall be included in the cleanup and shall be removed from work areas via the equipment decontamination enclosure at an appropriate time in the cleaning sequence. All asbestos waste in 6-mil poly disposal bags shall be double-bagged in the equipment decontamination enclosure before removal from the Site.
- J. At any time during asbestos removal, should the Consultant suspect contamination of areas outside the work area(s), they shall cause all abatement work to stop until the Contractor takes the necessary steps to decontaminate these areas, and eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections certify decontamination.
- **K.** After completion of the initial final cleaning procedure including removal of the inner layers of poly sheeting, but prior to encapsulation, a pre-sealant inspection shall be conducted by the Consultant. The pre-sealant inspection shall verify that ACM and residual dust has been removed from the work area.

### 3.6 ASBESTOS REMOVAL PROCEDURES – FLOORING

- **A.** Prior to the removal of flooring and associated mastic, the Contractor shall ensure that work area preparation has been conducted in accordance with Sections 3.2 and 3.4 of this Specification.
- **B.** The Contractor shall remove binding strips, all vinyl wall base or other restrictive molding from doorways, walls, etc., clean, and dispose of as non-asbestos waste. Dispose of any materials that have visible floor tile mastic attached to them as asbestos-containing waste.
- C. The Contractor shall wet the floor with amended water or detergent solution, so that entire surface is wet. Do not allow to puddle or run off into other areas. If a detergent is used, use in strict accordance with manufacturer's instructions. Allow time for humidity and water or removal encapsulant to loosen tiles prior to removal.
- **D.** The Contractor shall keep floor continuously wet throughout removal operation.
- **E.** Remove tiles using a manual or powered spade, or stripping machine. Continuously mist floor in area where machine is working with amended water, removal encapsulant or detergent solution. Wet any debris generated as necessary to keep continuously wet. Keep floor continuously wet where tile has been removed and until after completion of heavy adhesive residue removal.
- **F.** Remove flooring tiles, stack, place in boxes or wrap in felt, and place in labeled disposal bags. At the Contractor's option, tiles may be placed directly into durable leak-tight containers.
- **G.** Following removal of floor tiles, a layer (or layers) of adhesive will remain on the floor. The adhesive may be removed using shot/bead blast machines and/or chemical stripping agents. If chemical stripping agents are utilized, the Contractor must obtain the Owner's permission to use chemical stripping agents prior to use on-site.

### 3.7 ASBESTOS REMOVAL PROCEDURES - EXTERIOR WINDOWS SYSTEMS

- **A.** Prior to the removal of window systems, the Contractor shall ensure that work area preparation has been conducted in accordance with Sections 3.3 and 3.4 of this Specification.
- **B.** Spray asbestos materials with amended water using airless spray equipment, or apply an approved wetting agent to reduce the fiber release during removal operations.
- **C.** Remove exterior window systems and place directly into durable leak-tight containers, or in two 6-mil poly bags, and properly label.
- **D.** Surrounding surfaces, such as exterior brick/block, remaining window surfaces, etc. shall be thoroughly cleaned with HEPA-filter vacuum equipment, and wet-wiped to remove all visible dust and debris.
- **E.** When the Consultant completes their final visual inspection in a satisfactory manner, Contractor shall remove protective poly drop cloths by rolling in all 4 corners of the poly sheets.
- **F.** Check all ground surfaces in work areas after removal is complete, and the protective ground poly drop cloths have been removed. Remove and dispose any suspect ACM observed on the ground.

## 3.8 CONSULTANT'S RESPONSIBILITIES

- **A.** Air sampling may be conducted by the Consultant to ascertain the integrity of the controls that protect the building from asbestos contamination. Independently, the Contractor shall monitor air quality within the work area to ascertain the protection of employees, and to comply with OSHA regulations.
- B. The Consultant's project monitor may collect and analyze air samples during the following period:
  - Abatement Period. If required, or retained for this service, the Consultant's project monitor shall
    collect samples on a daily basis during the work period. A sufficient number of area samples shall
    be collected outside of the work area, at the exhaust of the negative pressure system, and outside

of the building to evaluate the degree of cleanliness or contamination of the building during removal. At the discretion of the Asbestos Project Monitor, additional air samples may be collected inside the work area and decontamination enclosure system.

- a. If the Consultant's Asbestos Project Monitor determines that the building air quality has become contaminated from the abatement project, they shall immediately inform the Contractor to cease all removal operations and implement a work stoppage clean-up procedure. The Contractor, via their Asbestos Abatement Contractor, shall conduct a thorough clean-up of the building areas designated by the Consultant. No further removal work may occur until the Asbestos Project Monitor has determined through air sample collection and analysis that the airborne fiber concentrations are at or below the CTDPH reoccupancy standard.
- C. The Consultant's project monitor shall collect and analyze air samples during the following period:
  - 1. Post-Abatement Period. If required, the Asbestos Project Monitor shall conduct air sampling following the final clean-up phase of the project, once the "no visible residue" criterion, as established by the Asbestos Project Monitor, has been met and the work area has been encapsulated by the Contractor. Five air samples shall be collected inside the work area utilizing aggressive methods to comply with the CTDPH Standards for Asbestos Abatement Section 19a-332a-12.
    - Final re-occupancy air clearance sampling shall be conducted by the Asbestos Project Monitor in accordance with the CTDPH requirements using one of the following methods:
      - 1) Transmission Electron Microscopy (TEM) method with an average limit of less than 70 s/mm² of filter surface.
      - Phase Contrast Microscopy (PCM) with a total airborne fiber concentration limit of less than or equal to 0.010 fibers/cc.
- **D.** The Owner shall be responsible for payment for the initial final clearance air sampling performance only. If the first set of samples fail to satisfy the re-occupancy criteria, the Contractor shall be responsible for payment of all costs associated with the additional final clearance air sampling and analysis.
- **E.** The Asbestos Project Monitor shall provide continual evaluation of the air quality of the building during removal, using their best professional judgment in respect to the CTDPH guideline of 0.010 fibers/cc, and the background air quality established during the pre-abatement period.
- **F.** Pre-abatement and abatement air samples shall be collected as required to obtain a volume of 1,200 liters. Samples shall be analyzed by PCM NIOSH 7400 Method.

## 3.9 CONSULTANT'S INSPECTION RESPONSIBILITIES

- **A.** The Consultant shall conduct inspections throughout the progress of the abatement project. Inspections shall be conducted to document the abatement work progress, as well as the procedures and practices employed by the abatement Contractor.
- **B.** The Consultant may perform the following inspections during the abatement activities:
  - Pre-commencement Inspection. Pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed 12-hours prior to the time the inspection is needed. If deficiencies are noted during the pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
  - Work Area Inspections. Work area inspections shall be conducted on a daily basis at the discretion
    of the Consultant. During the work inspections, the Consultant shall observe the Contractor's
    removal procedures, verify barrier integrity, monitor negative air filtration devices, assess project
    progress, and if deficiencies are noted, inform the abatement Contractor of specific remedial
    activities.
- **C.** The Consultant shall perform the following inspections during the abatement activities:
  - Pre-sealant Inspection. Upon the request of the Contractor, the Consultant shall conduct a pre-sealant inspection. The Consultant shall be informed 12-hours prior the time that the inspection is needed. The pre-sealant inspection shall be conducted after completion of the initial cleaning procedures, but prior to encapsulation. The pre-sealant inspection shall verify that all ACM and residual debris have been removed from the work area. If the Consultant identifies residual dust or

- debris during the pre-sealant inspection, the Contractor shall comply with the request of the Consultant to render the area "dust free".
- 2. <u>Final Visual Inspection</u>. Upon request of the abatement Contractor, the Consultant shall conduct a final visual inspection. Following the removal of the inner layer of poly sheeting, but prior to final air clearance, the Consultant shall conduct a final visual inspection inside the work area. If residual dust or debris is identified during the final inspection, the Contractor shall comply with the request of the Consultant to render the area "dust free".

#### 3.10 RE-OCCUPANCY AIR CLEARANCE AIR TESTING

- **A.** After the visual inspection is completed and all surfaces in the abatement area have dried, the Consultant shall conduct final re-occupancy air clearance sampling. Aggressive air monitoring will be used. Selection of location and of samples shall be the responsibility of the Consultant. Air monitoring volumes shall be sufficient to provide a detection limit of 0.010 fibers/cc using PCM NIOSH Method 7400, or a detection limit of 70 s/mm² utilizing TEM analysis as required.
- **B.** Areas that do not comply with the Standard for Cleaning for Initial Clearance shall continue to be cleaned by, and at, the Contractor's expense until the specified Standard of Cleaning is achieved, as evidenced by results of air testing results, as previously specified. This shall include all Consultant-based costs.
- **C.** The Contractor shall properly schedule abatement work and other site activities at appropriate times and locations to prevent cross contamination and/or dust in areas where the Asbestos Project Monitor will conduct air sampling.

### 3.11 ASBESTOS DISPOSAL

- **A.** Asbestos-containing and/or asbestos-contaminated material disposal must be in compliance with requirements of, and authorized by the EPA, CTDEEP, and the State of Connecticut.
- **B.** Disposal approvals shall be obtained before commencing asbestos removal.
- **C.** A copy of approved disposal authorization shall be provided to the Owner and the Consultant, and any required federal, state, or local agencies.
- D. Copies of all fully-executed Waste Shipment Records (WSR) will be retained by the Consultant as part of the project file. The Contractor shall document the specific amount of waste on each WSR, portion/location of the Site building it was generated from, and the type of waste. Upon receipt of the ACM waste, the landfill operator will sign the WSR, and the quantity of asbestos debris leaving the Site, and arriving at the landfill is documented for the Owner.
- **E.** All asbestos debris shall be transported in covered, sealed vans, boxes, or dumpsters, which are physically isolated from the driver by an airtight barrier. All vehicles must be properly-licensed to meet DOT requirements.
- **F.** Any vehicles used to store or transport ACM will either be removed from the Site at night, or securely locked and posted to prevent disturbance.
- **G.** Any incident and/or accident that may result in spilling or exposure of asbestos waste outside the containment, on and off the property, and all related issues shall be the sole responsibility of the Contractor.

**END OF SECTION 02 82 13** 

#### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- **A.** General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.
- **B.** Fuss & O'Neill EnviroScience, LLC (EnviroScience) Limited Hazardous Building Materials Inspection Report (December 2016).
- C. Contract Considerations Section 01 20 00.
- D. Asbestos Abatement Section 02 82 13.
- E. Lead-Based Paint Awareness Section 02 83 19.
- F. Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury Section 02 84 16.
- **G.** Hazardous Materials Abatement Drawings HM-01 HM-04.

### 1.2 CONSULTANT

- A. The Owner shall retain a Consultant for the purposes of project management and monitoring during Asbestos Roofing Abatement. The Consultant will represent the Owner in all phases of the abatement project at the discretion of the Owner. The Asbestos Abatement Roofing Contractor and/or Demolition Contractor (collectively, the "Contractor") will regard the Consultant's direction as authoritative and binding as provided herein, in matters particularly, but not limited to the following:
  - 1. Work area approval
  - 2. Monitoring results review
  - 3. Various segments of work completion
  - 4. Abatement final completion, data submission review
  - 5. Daily field punch list items.
- **B.** The State of Connecticut licensed Asbestos Consultant Project Designer for this project is Eduardo Miguel Marques (License # 000312).

## 1.3 SCOPE OF WORK

- **A.** Work outlined in this Section includes all work necessary for the removal, packaging, transportation, and disposal of asbestos-containing materials (ACM) located on the roofs that will be impacted during the Phase III Renovations and Additions (the "Work") at Norwalk Community College located at 188 Richards Avenue in Norwalk, Connecticut (the "Site").
- B. This shall include all necessary demolition to access the ACM for abatement.

### 1.4 USE OF THE CONTRACT DOCUMENTS

- **A.** It shall be incumbent upon the Contractor to visit the Site and determine existing conditions, and what will be required to accomplish the Work intended by the Contract Documents. No increase in the Contract Sum will be permitted as a result of the Contractor's failure to visit the building located at the Site and understand the existing conditions.
- **B.** All work shall comply with the Contract Documents and with applicable codes, laws, regulations, and ordinances, wherever applicable. The most stringent of all the foregoing shall govern.

- **C.** It is not intended that these Specifications show every detail of the Work, but the Contractor shall be required to furnish within the Contract Sum all materials and labor necessary for the completion of the Work in accordance with the intent of these Specifications.
- **D.** In case of ambiguity among the Contract Documents, the more stringent requirement as determined by the Consultant shall prevail.
- **E.** The Work of this Contract includes making modifications as necessary, subject to approval by Owner in consultation with the Consultant, to correct any conflicts between contract documents.
- **F.** All items that are not specifically mentioned in these Specifications, but are implied by trade practices to complete the Work, shall be included.

### 1.5 SITE EXAMINATION

- **A.** It is understood that the Contractor has examined the Site and made their own estimates of the Site facilities and difficulties attending the execution of the Work, and has based their bid price thereon.
- **B.** Except for unforeseeable concealed conditions as determined by the Consultant, the Contractor shall make no claim for additional costs due to the existing Site conditions.

## 1.6 CONTRACTOR QUALIFICATIONS

- **A.** All bidders shall submit a record of prior experience in asbestos abatement projects, listing no less than three completed projects in the past year, with all projects of similar size and scope. The Contractor shall list the experience and training of the project supervisor and all on-site personnel. The information to be included is as follows:
  - 1. Project Name and Address
  - 2. Owner's Name and Address
  - 3. Architect/Consultant
  - 4. Contract Amount
  - 5. Date of Completion
  - 6. Extras and Changes
- **B.** If the roofing materials to be removed become a regulated asbestos-containing material (RACM) during abatement, the selected Contractor must appear on the approved list of Asbestos Abatement Contractors on file at the State of Connecticut Department of Public Health (CTDPH) and hold a valid Asbestos Abatement Contractor license within the State of Connecticut.
- **C.** Submit a written statement regarding whether the Contractor has ever received a federal, state, or local non-compliance citation with the asbestos and/or lead regulations pertaining to worker protection, removal, transport, or waste disposal.

## 1.7 CONSTRUCTION PROGRESS SCHEDULE

- **A.** To assure adequate planning and execution of the Work and to assist the Consultant in reviewing the justification for the Contractor's applications for payment, the Contractor shall prepare and maintain a detailed Progress Schedule.
- **B.** The schedule of work of this Contract shall include the notification requirements to regulatory agencies for the work, if exterior materials will become friable during proposed removal operations. It shall be incumbent upon the Contractor performing the asbestos abatement to determine if proposed removal methods shall render the asbestos-containing exterior roofing materials friable or not.
- **C.** The Contractor shall supervise and direct all work of theirs and other trades using their best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the work under the Contract.

- **D.** Due to the nature of this construction work, the scheduling or phasing of work under this Contract may be adjusted by the Owner. As long as the scope of work is not altered, adjustments to the project phasing shall have no effect on the contract price.
- **E.** The Contractor and any sub-contractors shall attend a pre-construction meeting. The assigned Supervisor must attend this meeting.

### 1.8 TESTING LABORATORY SERVICES

**A.** The Contractor shall submit to the Consultant the name; address and qualifications of proposed laboratories intended to be utilized for sample analysis as required by this Section.

### 1.9 ADDITIONAL GENERAL REQUIREMENTS

- **A.** The Contractor shall employ a competent Supervisor with at least three years of experience on projects of similar scope and magnitude, who shall be responsible for all work involving asbestos abatement, as described in the specifications and defined in applicable regulations, and have full-time daily supervision of the same. The Supervisor shall be the competent person as defined by OSHA regulations.
- **B.** Should the ACM become friable during removal, the Contractor shall employ a competent Asbestos Abatement Supervisor with at least three years of experience on projects of similar scope and magnitude, who shall be responsible for all work involving asbestos abatement as described in the specifications, and defined in applicable regulations, and have full-time daily supervision of the same.
- **C.** If requested or required by local, state, federal, and any other authorities having jurisdiction over such work, the Contractor shall allow the Work of this Contract to be inspected. The Contractor shall immediately notify the Owner and the Consultant and shall maintain written evidence of such inspection for review by the Owner and the Consultant.
- **D.** The Contractor shall incur the cost of all fines resulting from regulatory non-compliance, as issued by federal, state, and local agencies. The Contractor shall incur the cost of all work requirements mandated by federal, state, and local agencies as a result of regulatory non-compliance or negligence.
- **E.** The Contractor shall immediately notify the Owner and Consultant of the delivery of all permits, licenses, certificates of inspection, of approval, or occupancy, etc., and any other such instruments required under codes by authorities having jurisdiction, regardless of who issued, and shall cause them to be displayed to the Owner and Consultant for verification and recording.

## 1.10 PROJECT DESCRIPTION

- **A.** The base bid includes the removal, packaging, transportation, and disposal of all ACM as identified herein, conducted by workers meeting the requirements of OSHA Title 29 CFR, Part 1926.1101 for Class 2 work.
- **B.** The quantities listed herein are estimates only, and should be verified on-site by the Contractor.
- **C.** This base bid includes the following materials and locations:

# **BASE BID - ASBESTOS**

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY			
East Campus PepsiCo Theater					
Surrounding Pitched Roof adjacent to Theatre Roof	Cementitious Roof Shingles and Associated Black Roofing Paper	136 SF (estimated quantity includes adjacent roof shingles/paper that may potentially be impacted by roof renovations)			

LOCATION	MATERIAL TYPE	ESTIMATED QUANTITY		
Theatre Roof	Loose Black Roofing Paper Debris (Origin of material is from surrounding adjacent pitched roof system)	100 SF		
West Campus Student Center				
Upper Roof (Roof 1) and Lower Roofs (Roofs 2 & 3)	Layered Roofing at Penetrations and Perimeter Edges (includes built-up, pitch tar, flashings, and base sheet)	1,000 SF		

- **D.** Some of the Work will be performed in multiple mobilizations, at different periods of time, in conjunction with other trades (i.e., other trades work, demolition work, etc.).
- **E.** Safety Data Sheets (SDS) for chemicals to be used during the project must be submitted to the Consultant prior to site delivery.
- **F.** The Contractor shall be responsible for providing temporary water, power, and heat as needed at the Site. Temporary lighting within the work areas must be connected to Ground Fault Circuit Interrupter (GFCI) power panels, installed by a State of Connecticut-licensed electrician, and located outside of the work areas.
- **G.** The Contractor shall be responsible for providing preparation of negative pressure enclosures (NPE), cleaning, etc. at no additional cost to the Owner, if work practices result in ACM breaching the roof deck, and entering the building during abatement.

#### 1.11 DEFINITIONS

- **A.** The following definitions relative to asbestos roof abatement shall apply:
  - Abatement Procedures to control fiber release from ACM; includes removal, encapsulation, and enclosure.
  - 2. <u>Air Monitoring</u> The process of measuring the total airborne fiber concentration of an area or exposure of a person.
  - 3. <u>Amended Water</u> Water to which a surfactant has been added.
  - 4. <u>Asbestos</u> The name given to a number of naturally occurring fibrous silicates. This includes the serpentine forms and the amphiboles and includes chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite, or any of these forms, which have been chemically altered.
  - 5. <u>Asbestos Felt</u> A product made by saturating felted asbestos with asphalt or other suitable bindery, such as a synthetic elastomer.
  - 6. <u>Asbestos Fibers</u> Those particles with a length greater than five (5) microns (μ) and a length to diameter ratio of 3:1 or greater.
  - 7. <u>Asbestos Work Area</u> A regulated area as defined by OSHA Title 29 CFR, Part 1926.1101 where asbestos abatement operations are performed that is isolated by physical barriers to prevent the spread of asbestos dust, fibers, or debris. The regulated area shall comply with requirements of regulated area for demarcation, access, respirators, prohibited activities, competent persons and exposure assessments and monitoring.
  - 8. <u>Asphalt Shingles, Composition Shingles, or Strip Slates (Pitched Roof Shingle)</u> A roofing material manufactured by saturating a dry felt with asphalt then coating the saturated felt with a harder asphalt mixed with a fine mineral, glass fiber, asbestos or organic stabilizer. All or part of the weather side may be covered with mineral granules, or with powdered talc or mica.
  - 9. <u>Base Flashing (Roof)</u> The flashing provided by upturned edges of a water-tight membrane on a roof. May contain metal and associated waterproofing material or combination of roofing felts and waterproofing at the joint between a roofing surface and a vertical surface, such as a wall or parapet. Also base flashing may be present at perimeter of completely flat roof.
  - 10. <u>Built-Up Roofing (Composition Roofing, Felt and Gravel Roofing, Gravel Roofing)</u> A continuous roof covering comprised of laminations or plies of saturated or coated roofing felts, alternated with layers of asphalt or coal-tar pitch and surfaced with gravel, paint or finish coat.
  - 11. <u>Category I Non-Friable Material</u> Asbestos-containing packings, gaskets, resilient floor coverings, and asphalt roofing products.
  - 12. Category II Non-Friable Material Any non-friable ACM not designated as Category I.

- 13. <u>Caulking</u> Resilient mastic compound often having a silicone bituminous or rubber base; used to seal cracks, fill joints, and prevent leakage. Typical applications: around windows, and doors. Caulking is at joints between two dissimilar materials. (i.e., masonry to wood, masonry to steel)
- 14. <u>Clean Room</u> An uncontaminated area or room, which is a part of the worker decontamination system with provisions for storage of workers' street clothes and protective equipment.
- 15. Clearance Sampling Final air sampling performed aggressively after the completion of the abatement project within a regulated area. Air samples collected by the air sampling professional having a total airborne fiber concentration of less than 0.010 fibers per cubic centimeter of air (fibers/cc) in each of five (5) air samples collected inside the NPE will indicate acceptable area reoccupancy by Phase Contrast Microscopy (PCM), or five air samples collected inside the NPE by the Consultant having an average asbestos concentration of less than 70 structures per square millimeter (< 70 s/mm²) of air will indicate area re-occupancy using Transmission Electron Microscopy (TEM).
- 16. Competent Person As defined by OSHA Title 29 CFR, Part 1926.1101, a representative of the Abatement Contractor who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure. Person who has authority to take prompt corrective measures to eliminate such hazards during asbestos removal. Competent person shall be properly trained in accordance with EPA Model Accreditation Plan (MAP).
- 17. Consultant Fuss & O'Neill EnviroScience, LLC
- 18. <u>Curtained Doorway</u> A device to allow ingress and egress from one area to another while permitting minimal air movement between the areas. Two curtained doorways spaced a minimum of six feet apart can form an airlock.
- 19. <u>Damproofing</u> The application of a water-impervious material to surface such as wall to prevent penetration of moisture, typically at foundation or below grade surface.
- Decontamination System A series of connected areas, with curtained doorways between any two
  adjacent areas, for worker and equipment decontamination. A decontamination system always
  contains at least one airlock and is adjacent and connected to the regulated area, where possible.
- 21. <u>Encapsulant</u> A liquid material which can be applied to ACM that controls the possible release of asbestos fibers from the materials either by creating a membrane over the surface (bridging encapsulant), or penetrating the material and binding its components together (penetrating encapsulant).
- 22. <u>Equipment Room</u> Any contaminated area or a room that is part of the worker decontamination system with provisions for storage of contaminated clothing and equipment.
- 23. <u>Fixed Object</u> Unit of equipment or furniture in the work area that cannot be removed from the work area.
- 24. <u>Friable Asbestos Materials</u> Any material that contains more than 1% asbestos by weight, that can be crumbled, pulverized or reduced to powder by hand pressure.
- Glazing Any compound used to hold window glass in place, also referred to as putty, or glazier's putty. Is not field-applied, usually installed during manufacture of windows.
- 26. <u>GFCI</u> Ground Fault Circuit Interrupter
- 27. HEPA High Efficiency Particulate Air
- 28. HEPA Filter Filter in compliance with ANSI Z9.2 1979.
- 29. <u>HEPA Vacuum Equipment</u> Vacuum equipment equipped with a HEPA filter system for filtering the air effluent.
- 30. Movable Object Unit of equipment of furniture in the work area that can be removed from the work area.
- 31. <u>Negative Air Pressure Equipment</u> A portable local exhaust system equipped with HEPA filtration used to create negative pressure in a regulated area (negative with respect to adjacent unregulated areas) and capable of maintaining a constant, low velocity air flow into regulated areas from adjacent unregulated areas.
- 32. <u>NESHAPs</u> National Emissions Standard for Hazardous Air Pollutants regulations enforced by the EPA.
- 33. <u>Owner:</u> An employee or executive who has the principle responsibility for a process, program, or project.
- 34. <u>Penetration Roof Flashing</u> Flashing are used to waterproof pipes, supports, cables, and all roof protrusions.
- 35. Permissible Exposure Limit (PEL) The maximum total airborne fiber concentration to which an employee is allowed to be exposed. The limit established by OSHA Title 29 CFR, Part 1926.1101 is 0.1 fibers/cc as an 8-hour TWA and 1.0 fibers/cc averaged over a sampling period of 30 minutes as an Excursion Limit. The Contractor shall be responsible for maintaining work areas in a manner that this standard is not exceeded.

- 36. <u>Project Monitor</u> A professional capable of conducting air monitoring and analysis of schemes. This individual should be an industrial hygienist, an environmental scientist, or an engineer with experience in asbestos air monitoring and worker protection equipment and procedures. This individual should have demonstrated proficiency in conducting air sample collection in accordance with OSHA Title 29 CFR, Parts 1910.1001 and 1926.1101.
- 37. Regulated Asbestos-Containing Material (RACM) Is a friable ACM, or a Category I non-friable ACM that has become friable or will be or has been subjected to sanding, grinding, cutting or abrading, or Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by force expected to act on the material during demolition or renovation operations.
- 38. Regulated Area An area established by the employer to demarcate where Class I, II, and III asbestos abatement is conducted, and any adjoining area where debris and waste from such asbestos work accumulate, and a work area within which airborne concentrations of asbestos exceed or there is a reasonable possibility that they may exceed the PEL.
- 39. <u>Shower Room</u> A room between the clean room and the equipment room in the work decontamination system with hot and cold running water and suitably arranged for employee showering during decontamination. The shower room is located in an airlock between the contaminated area and the clean area.
- 40. <u>Waterproofing</u> Material, usually a membrane or applied compound (tar/mastic), used to make a surface impervious to water, includes concealed conditions (applications around doors, windows, and in wall cavities): Sometimes combined with felts.

### 1.12 SUBMITTALS

- **A.** The Contractor shall submit the following to the Consultant in one complete package prior to the preconstruction meeting, and no later than 10 business days prior to the anticipated start of the Work:
  - 1. Submit a schedule to the Owner and the Consultant that defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, decontamination, and final clearance air monitoring (if applicable).
  - 2. Submit the current valid CTDPH Asbestos Abatement Contractor license (if materials become RACM during removal) and certificate of insurance.
  - 3. Submit the name and address of the hauling contractor and location of the landfill to be used. Also submit current valid operating permits and certificates of insurance for the transporter and landfill.
  - 4. Submit the plans and construction details for the construction of the decontamination systems and the isolation of the work areas as may be necessary for compliance with this specification and applicable regulations.
  - 5. Submit the CTDPH license (if applicable), training, medical, and respirator fit test records of each employee who may be on the project site.
  - 6. Submit the qualifications of the air sampling professional that the Contractor proposed to use for this project to perform OSHA-required employee exposure monitoring.
  - 7. Submit detailed product information on all materials and equipment proposed for asbestos abatement work on this project.
  - 8. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project as well as a list of past projects completed.
  - 9. Submit a chain-of-command for the project.
  - 10. Submit a site-specific Emergency Action Plan for the project.
  - 11. Submit a written site-specific Respiratory Protection Program for employees for the Work, including make, model and National Institute of Occupational Safety and Health (NIOSH) approval numbers of respirators to be used at the Site (if applicable).
- **B.** No work on the Site will be allowed to begin until the Owner and the Consultant as listed herein approve the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation in a timely manner does not constitute a cause for change order or a time extension;
- **C.** The Contractor shall submit the following to the Consultant during the work:
  - Copies of personal air sampling results (Consultant will not review or provide any direction or advice regarding results). The Contractor shall be responsible for proper sample analytical review and personal protective equipment (PPE) selection and use. Records are retained solely for project record.
  - 2. Copies of training, CTDPH licenses (if applicable), fit test records, and medical records for new employees to start work (24-hours in advance), and prior to the new employee arriving at the Site.

- 3. Carbon copies from waste shipment record, waste manifest records, bill of lading, or other waste tracking record for all specified materials.
- 4. Copies of daily log sheets, daily sign-in sheets, and containment sign-in sheets.
- **D.** The Contractor shall submit the following to the Consultant at the completion of work. The Owner reserves right to retain payment(s) until all items are received in completion:
  - Original final completed copies of the waste shipment records, signed by all transporters and the designated disposal site owner/operator.
  - Original final completed copies of bill of laden, weight tickets, recycling tickets, and manifests for all specified materials.
  - 3. Contractor's logs (daily activity logs, daily sign in sheets, containment sign-in sheets), and all worker training, CTDPH licenses (if applicable), medical records and respirator fit test records.
  - 4. Copies of all OSHA personal monitoring results.

## 1.13 REGULATIONS AND STANDARDS

- **A.** The Contractor shall be solely responsible for conducting this project and supervising all work in a manner that will be in conformance with all federal, state, and local regulations and guidelines pertaining to asbestos abatement. Specifically, the Contractor shall comply with the requirements of the following:
  - EPA National Emissions Standards for Hazardous Air Pollutants (NESHAPS) Regulations (Title 40 CFR, Part 61, Subpart M);
  - 2. OSHA Asbestos Regulations (Title 29 CFR, Parts 1910.1001 and 1926.1101); and
  - 3. Department of Transportation (DOT) Hazardous Waste Transportation Regulations (Title 49 CFR, Parts 170 180).
  - 4. Connecticut Department of Energy and Environmental Protection (CTDEEP) Regulations (Section 22a-209-8(i) and Section 22a-220 of the Connecticut General Statutes);
  - 5. CTDPH Standards for Asbestos Abatement (Sections 19a-332a-1 to 19a-332a-16);
  - 6. CTDPH Licensing and Training Requirements for Persons Engaged in Asbestos Abatement and Asbestos Consultant Services (Sections 20-440-1 to 20-440-9 and Section 20-441);
  - 7. 2003 International Building Code as adopted by the 2005 State of Connecticut Building Code including the 2009, 2011, 2013, and 2016 amendments;
  - 8. Life Safety Code, National Fire Protection Association (NFPA);
  - Local health and safety codes, ordinances or regulations pertaining to asbestos remediation and all national codes and standards including American Society of Testing and Materials (ASTM), American National Standards Institute (ANSI), and Underwriter's Laboratories (UL).

### 1.14 EXEMPTIONS

- **A.** Any deviations from these specifications require the prior written approval and authorization from the Owner and the Consultant.
- **B.** Any modifications from the standard work practices identified in the CTDPH Standards for Asbestos Abatement, Sections 19a-332a-1 to 19a-332a-16 must be requested in writing and approved in writing by the CTDPH.

## 1.15 FINAL RE-OCCUPANCY AIR CLEARANCE

A. Not applicable for exterior non-friable roof abatement project.

# 1.16 NOTIFICATIONS, POSTINGS, SUBMITTALS, AND PERMITS

- A. The Contractor shall make the following written notifications, and provide the submittals to the following agency prior to the commencement of abatement if the work is going to render the ACM friable. These notifications are required 10-calendar days prior to the start of the abatement project:
  - 1. Connecticut Department of Public Health

410 Capitol Avenue MS #51 AIR P.O. Box 340308 Hartford, CT 06134

- B. The minimum information included in the notification to these agencies includes:
  - 1. Name and address of building Owner/Operator
  - 2. Building location
  - 3. Building size, age, and use
  - 4. Asbestos quantity
  - 5. Work schedule, including proposed start and completion date
  - 6. Asbestos removal procedures to be used
  - 7. Name and location of disposal site for generated asbestos waste, residue, and debris
  - If landfill opens in Connecticut to accept ACM waste, Consultant will notify DEEP prior to utilizing said landfill

### 1.17 WORK SITE SAFETY PLAN

- **A.** The Contractor shall establish a set of emergency procedures and shall post them in a conspicuous place at the Site. The safety plan should include provisions for the following:
  - Evacuation of injured workers.
  - 2. Emergency and fire exit routes from all work areas.
  - 3. Emergency first aid treatment.
  - 4. Local telephone numbers for emergency services including ambulance, fire, and police.
  - 5. A method to notify occupants of the building in the event of a fire or other emergency requiring evacuation of the building.
- **B.** The Contractor shall be responsible for properly training all workers in these procedures.

#### 1.18 INDEPENDENT AIR SAMPLING AND ASBESTOS ABATEMENT MONITORING

- A. This Section describes independent air sampling work being performed on behalf of the Owner. This work is not in the Contract Sum. This Section describes air monitoring conducted by the Consultant to verify that the outside environment remains uncontaminated. (Personal air monitoring required by OSHA is work shall be performed by the Contractor and is within the Contract Sum.)
- **B.** The purpose of the Consultant's air monitoring is to document engineering controls utilizing during asbestos abatement are functioning properly. Air monitoring will focus on possible:
- **C.** Contamination of the building outside of the work area by airborne asbestos fibers.
- D. Contamination of air outside the building envelope by airborne asbestos fibers.
- **E.** Should either of the above be determined to have occurred based on Consultant's air monitoring, the Contractor shall immediately cease all asbestos abatement activities until the fault is corrected. Do not resume work until authorized by the Owner's Consultant. To determine if the elevated total airborne fiber concentrations encountered during abatement operations have been reduced to an acceptable level below 0.010 f/cc, the Consultant will collect and analyze air samples in accordance with re-occupancy clearance air sampling requirements.
- **F.** The Consultant may monitor total airborne fiber concentrations in the Work Area. The purpose of this air monitoring will be to detect airborne fiber concentrations, which may challenge the ability of the work area isolation procedures to protect the balance of the building or the building exterior from possible contamination by airborne fibers.
- **G.** To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to an acceptable level, the Consultant will collect and analyze air samples in accordance with clearance air sampling requirements.
- H. The Consultant may perform on-site monitoring throughout the project, as follows:
- I. All work procedures shall be continuously monitored by the Consultant to assure that areas outside the designated work locations in the building will not be contaminated.

J. Prior to work on any given day, the Contractor's designated "Competent Person" shall discuss the day's work schedule with the Consultant to evaluate job tasks with respect to safety procedures and requirements specified to prevent building contamination or the employees. This includes a work area visual inspection and the building decontamination or the employees. This includes a work area visual inspection and the decontamination systems.

### 1.19 CONTRACTOR'S AIR SAMPLING RESPONSIBILITY

- **A.** The Contractor shall independently retain an air sampling professional to monitor total airborne fiber concentrations in the workers' breathing zone and to establish conditions and work procedures for maintaining compliance with OSHA Regulations Title 29 CFR, Parts 1910.1001 and 1926.1101.
- **B.** The Contractor's air sampling professional shall document all air sampling results and provide a report to the Consultant within 48-hours after sample collection.
- C. All air sampling shall be conducted in accordance with methods described in OSHA Standards Title 29 CFR, Parts 1910.1001 and 1926.1101.

#### 1.20 PROPER WORKER PROTECTION

- **A.** This Section describes the equipment and procedures required for protecting workers against asbestos contamination and other workplace hazards, except for respiratory protection.
- **B.** All workers are to be accredited as Abatement Workers as required by the EPA's AHERA regulation Title 40 CFR, Part 763 Appendix C to Subpart E, February 3, 1994.
- C. The Contractor must be licensed and accredited, as required by CTDPH, if removal work practices render the materials RACM.
- D. In accordance with OSHA Title 29 CFR, Part 1926, all workers shall receive a training course covering the dangers inherent in handling asbestos, the dangers of breathing asbestos dust, proper work procedures, and proper worker protective measures. This course must include, but is not limited to the following:
  - 1. Methods of recognizing asbestos
  - 2. Health effects associated with asbestos
  - 3. Relationship between smoking and asbestos in producing lung cancer
  - 4. Nature of operations that could result in exposure to asbestos
  - 5. Importance of and instruction in the use of necessary protective controls, practices and procedures to minimize exposure including:
    - a. Engineering controls
    - b. Work Practices
    - c. Respirators
    - d. Housekeeping procedures
    - e. Hygiene facilities
    - f. Protective clothing
    - g. Decontamination procedures
    - h. Emergency procedures
    - i. Waste disposal procedures
  - Purpose, proper use, fitting, instructions, and limitations of respirators as required by OSHA Title 29 CFR, Part 1910.134
  - 7. Appropriate work practices
  - 8. Requirements of medical surveillance program
  - 9. Review of OSHA Title 29 CFR, Part 1926
  - 10. Pressure Differential Systems
  - 11. Work practices including hands on or on job training
  - 12. Personal decontamination procedures
  - 13. Air monitoring (personal and area)
- E. The Contractor shall provide medical examinations for all workers who may encounter a total airborne fiber concentration of 0.1 fibers/cc or greater for an 8-hour TWA. In the absence of specific airborne fiber data, provide medical examinations for all workers who will enter the work area for any reason. Examination

shall, at a minimum, meet OSHA requirements as set forth in Title 29 CFR, Part 1926. In addition, provide an evaluation of the individual's ability to work in environments capable of producing heat stress in the worker.

- **F.** Submit the following to the Consultant for review. The Contractor shall not start work until these submittals are returned with Consultant action stamp indicating that they are accepted.
  - Submit copies of certificates from an EPA-approved AHERA Abatement Worker course for each worker as evidence that each asbestos Abatement Worker is accredited as required by EPA AHERA Regulation Title 40 CFR, Part 763 Appendix C to Subpart E, February 3, 1994.
  - Submit evidence that the Contractor is certified to perform asbestos abatement work by the State of CTDPH
  - 3. Submit documents verifying that each worker has had a medical examination within the last 12 months, as part of compliance with OSHA medical surveillance requirements. Submit, at a minimum, for each worker the following:
  - 4. Name and Social Security Number
  - 5. Physician's Written Opinion including at a minimum the following:
  - 6. Whether worker has any detected medical conditions that would place the worker at an increased risk of material health impairment from exposure to asbestos.
  - 7. Any recommended limitations on the worker or on the use of personal protective equipment such as respirators.
  - 8. Statement that the worker has been informed by the physician of the results of the medical examination and of any medical conditions that may result from asbestos exposure.
  - Copy of information that was provided to physician in compliance with OSHA Title 29 CFR, Part 1926.
  - 10. Statement that worker is able to wear and use the type of respiratory protection proposed for the project, and is able to work safely in an environment capable of producing heat stress in the worker.
  - 11. Submit copies of certificates for the site supervisor and the workers issued by CTDPH.
  - 12. Submit certification signed by an officer of the abatement-contracting firm and notarized that personal exposure measurements, medical surveillance, and worker training records are in conformance with OSHA Title 29 CFR. Part 1926.
- **G.** The Contractor shall maintain control of and shall be responsible for access to all work areas to ensure the following requirements:
  - 1. Non-essential personnel are prohibited from entering the area
  - 2. All authorized personnel entering the work area shall read the "Worker Protection Procedures" which are posted at the entry points to the system, and shall be equipped with properly-fitted respirators and protective clothing
  - All personnel who are exiting from the decontamination system shall be properly and thoroughly decontaminated.
  - 4. Asbestos waste that is removed from the work area must be properly containerized and labeled in accordance with these specifications. The exterior surface of the containers shall be decontaminated. Asbestos waste must be immediately transported off site or immediately placed in locked, posted temporary storage located on site, and removed within 24-hours of project completion.
  - 5. Any material, equipment, or supplies that are removed from the decontamination system shall be thoroughly cleaned and decontaminated by wet cleaning and/or HEPA vacuuming of all surfaces.

## **PART 2 - PRODUCTS**

#### 2.1 MATERIALS

- **A.** Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name and product technical description.
- **B.** Damaged or deteriorating materials shall not be used and shall be removed from the Site. Material that becomes contaminated with asbestos shall be decontaminated or disposed as asbestos waste.

- **C.** Polyethylene (poly) sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with a factory label indicating 4 or 6–mil thickness.
- **D.** Poly disposable bags shall be 6-mil thickness with pertinent pre-printed label. Tie wraps for bags shall be plastic, five-inches long (minimum), pointed and looped to secure filled plastic bags.
- **E.** Tape or spray-adhesive will be capable of sealing joints in adjacent poly sheets, and for attachment of poly to dissimilar finished or unfinished surfaces and capable of adhering under both dry and wet conditions, including amended water.
- **F.** Surfactant (wetting agent), shall consist of 50 percent polyoxyethylene ether and 50 percent polyoxyethylene ester, or equivalent, and shall be mixed with water to provide a concentration of one ounce surfactant to five-gallons of water or as directed by manufacturer.
- **G.** Removal encapsulant shall be non-flammable factory prepared penetrating chemical encapsulant deemed acceptable to Consultant. Usage shall be in accordance with manufacturer's printed technical data.
- **H.** The Contractor shall have available spray equipment capable of mixing wetting agent with water and capable of generating sufficient pressure and volume, and having sufficient hose length to reach all areas with asbestos.
- I. Impermeable containers are to be used to receive and retain asbestos-containing or contaminated materials until disposal at an acceptable disposal site. The containers shall be labeled in accordance with OSHA Title 29 CFR, Part 1926.1101. Containers must be both air and watertight.
- J. OSHA-required asbestos labels, warning signs, and/or warning tape shall be used.
- **K.** Encapsulant shall be bridging or penetrating type that has been deemed acceptable to the Consultant. Usage shall be in accordance with manufacturer's printed technical data.

#### 2.2 TOOLS AND EQUIPMENT

- **A.** The Contractor shall provide all tools and equipment necessary for asbestos removal, encapsulation, and enclosure.
- **B.** The Contractor's air monitoring professional shall have air-monitoring equipment of type and quantity to monitor operations and conduct personnel exposure surveillance per OSHA requirements.
- **C.** The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the Work including protective clothing, respirators, filter cartridges, poly sheeting of proper size and thickness, tape, and air filters.
- **D.** The Contractor shall provide (as needed) temporary electrical power panels, electrical power cables, and electrical power sources (such as generators). Any electrical connection work affecting the building electrical power system shall be performed by a State of Connecticut-licensed electrician.
- **E.** The Contractor shall have available shower stalls and plumbing to support same to include sufficient hose length and drain system, or an acceptable alternate.
- **F.** Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometers in diameter or larger.

### **PART 3 - EXECUTION**

### 3.1 PRE-CONSTRUCTION MEETING

- **A.** At least one week prior to the start of work a Pre-Construction Meeting will be scheduled, and must be attended by the Contractor and any Sub Contractors. The assigned Contractor Site Supervisor must also attend this meeting.
- **B.** The Contractor shall present a detailed project schedule and project submittal package at the Pre Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and Consultant will inform the Contractor of any scheduling adjustments for this project.
- **C.** Following the Pre-Construction Meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

#### 3.2 WORK AREA PREPARATION

- **A.** Where necessary deactivate electrical power. Provide GFCI devices, temporary power, and temporary lighting installed in compliance with the applicable electrical codes. All installations are to be made by a State of Connecticut-licensed electrician.
- **B.** Deactivate and/or isolate heating, ventilating, and air conditioning (HVAC) air systems or zones to prevent contamination and fiber dispersal within the structure. During the work, rooftop vents around the work area shall be completely sealed with duct tape and two layers of 6-mil thick poly.
- **C.** Completely seal all openings, including, but not limited to, roof level HVAC air intake sources, windows adjacent to removal (within ten feet) skylights, ducts, grills, diffusers, and any other penetration of the work areas, with poly a minimum of 6-mil thick, sealed with duct tape.

### 3.3 DECONTAMINATION SYSTEM

- **A.** The Contractor shall establish on-site, a remote decontamination enclosure consisting of equipment room, shower room, and clean room in series.
- **B.** Access between rooms in the decontamination system shall be through double flap-curtained openings. The clean room, shower, and equipment rooms within the decontamination enclosure shall be completely sealed.
- **C.** Construct the decontamination system with plastic, wood, or metal framing and cover both sides with a double layer of 6-mil poly, sealed with spray glue or tape at the joints.
- **D.** The Contractor and the Consultant shall visually inspect barriers routinely to assure effective seal, and the Contractor shall repair defects immediately.

### 3.4 ASBESTOS REMOVAL PROCEDURE - GENERAL

- **A.** Following a federal court of appeals decision, OSHA has issued a final rule on June 29, 1998, removing regulation of asbestos-containing asphalt roof cements, mastics and coatings from the OSHA standards for occupational exposure to asbestos in construction and shipyard work. However, friable materials (felts, papers, etc.) are still regulated by OSHA, federal (no visible emissions), and state entities.
- **B.** Exterior non-friable materials which are not RACM as defined by the EPA and CTDPH are not required to be removed by a CTDPH-licensed Asbestos Abatement Contractor in the State of Connecticut. This applies as long as the proposed methods of removal will not render the Category I non-friable roofing materials RACM during proposed roof removal operations.

- C. Supervisors and workers are not required to be certified in the State of Connecticut unless the Category I non-friable roofing materials become RACM. Workers must be properly trained in compliance with OSHA regulations.
- **D.** The Contractor shall have a designated "competent person" on the job at all times to ensure proper work practices throughout the project.
- **E.** The Contractor shall regulate the work area as required for compliance with OSHA regulation Title 29 CFR, Part 1926.1101 to prohibit non-trained workers from entering areas where ACM are to be removed.
- F. The Contractor shall establish worker decontamination unit remote from the work area.
- G. The Contractor shall spray ACM with amended water using airless spray equipment, or apply approved removal wetting agent to ensure no visible emissions during removal of Category I non-friable roofing materials.
- **H.** The adequately-wet asbestos must be removed in manageable sections. Material drop shall not exceed eight feet. For heights up to 15 feet above ground surface, provide inclined chutes, or scaffolding to intercept drop. For heights exceeding 15 feet, the Contractor shall provide an enclosed dust-proof chute.
- I. After completion of stripping work, all surfaces from which ACM has been removed shall be wet cleaned or cleaned by an equivalent method to remove all visible suspect ACM (wire brushes are prohibited). During this work, the surfaces being cleaned shall be kept adequately wet, without causing a safety hazard.
- **J.** Remove and containerize all visible accumulations of asbestos-containing and/or asbestos-contaminated debris. Waste shall be containerized in labeled and signed 6-mil poly disposable bags. Tie wraps for bags shall be plastic, 5-inches long (minimum), pointed and looped to secure filled plastic bags.
- K. At any time during asbestos abatement should the Consultant suspect contamination of areas outside the work area(s), they shall issue a stop work order until the Contractor takes required steps to decontaminate these areas, and to eliminate the causes of such contamination. Unprotected individuals shall be prohibited from entering suspected contaminated areas until air sampling and visual inspections indicate acceptable decontamination.
- L. The Consultant shall conduct a final visual inspection of the work area. If residual suspect ACM debris is identified during the course of the final inspection, the Contractor shall comply with the Consultant's request to render the area clean of all residual ACM.

## 3.5 CONSULTANT'S RESPONSIBILITIES

- **A.** Air sampling shall be conducted by the Consultant to ascertain the integrity of engineering controls that protect the building from possible asbestos contamination. Independently, the Contractor shall monitor air quality within the work area to ascertain the protection of employees, and to comply with OSHA regulations.
- **B.** The Consultant's air sampling professional shall collect and analyze air samples during the following time period:
  - 1. <u>Abatement Period</u>. If required, the Consultant's project monitor shall collect air samples on a daily basis during the work period. A sufficient number of area air samples shall be collected upwind and downwind of the work area, waste debris chute (if applicable) and outside of the building to evaluate the degree of cleanliness or contamination of the building during removal. Additional air samples may be collected inside the work zone and decontamination system, at the discretion of the project monitor.
- **C.** The Consultant's project monitor shall provide continual evaluation of the air quality outside the building during removal, using their best professional judgment in respect to the CTDPH guideline of 0.010 f/cc, and the background air quality established during the pre-abatement period.

- D. If the project monitor determines that the air quality has become contaminated from the project, they shall immediately inform the Contractor to cease all removal operations and implement a work stoppage clean up procedure. The Contractor shall conduct a thorough cleanup of the building areas designated by the Consultant. No further removal work may occur until the project monitor has assessed that the building air has been decontaminated.
- **E.** Abatement air samples shall be collected as required to obtain a volume of 1,200 liters of air. Air samples shall be analyzed by PCM NIOSH Method 7400 sampling protocol.

#### 3.6 CONSULTANT'S INSPECTION RESPONSIBILITIES

- **A.** Consultant shall conduct inspections throughout the progress of the abatement project. Inspections shall be conducted to document the progress of the abatement work, as well as the procedures and practices employed by the Contractor.
- **B.** The Consultant shall perform the following inspections during abatement activities:
  - Pre-commencement Inspection. Pre-commencement inspections shall be performed at the time requested by the abatement Contractor. The Consultant shall be informed a minimum of 12-hours prior to the time the inspection is required. If deficiencies are identified during the precommencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
  - Work Area Inspection. Work area inspections shall be conducted on a daily basis at the discretion
    of the Consultant. During the work inspections, the Consultant shall observe the Contractor's
    removal methods and procedures, verify barrier integrity, monitor negative air filtration devices,
    assess project progress, and inform the Contractor of specific remedial activities if deficiencies are
    noted.
  - 3. <u>Final Visual Inspection</u>. Upon request of the Contractor, the Consultant shall conduct a final work area visual inspection. If residual dust or debris is identified during the final inspection, the Contractor shall comply with the request of the Consultant to render the area "dust free".

## 3.7 DISPOSAL OF ASBESTOS

- **A.** Disposal of ACM or asbestos-contaminated material must be in compliance with requirements of and authorized by DEEP and CTDPH.
- **B.** Disposal approvals shall be obtained before commencing asbestos abatement.
- **C.** A copy of approved disposal authorization shall be provided to the Owner and Consultant, and any required federal, state, or local agencies.
- **D.** The Consultant will retain copies of all Waste Shipment Records as part of the project file. On receipt, the landfill operator will sign the receipts, and the quantity of asbestos debris leaving the Site and arriving at the landfill acknowledged.
- **E.** All asbestos debris shall be transported in covered, sealed vans, boxes, or dumpsters, which are physically isolated from the driver by an airtight barrier. All vehicles must be properly licensed to meet DOT requirements.
- **F.** Any vehicles used to store or transport ACM will either be removed from the property at night, or shall be securely locked and posted to prevent disturbance.
- **G.** Any incident and/or accident that may result in spilling, exposure, or environmental release of asbestos waste outside the work area, on and off the property, and all related issues shall be the sole responsibility of the Contractor.

**END OF SECTION 02 82 14** 

## **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS

- **A.** General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.
- **B.** Fuss & O'Neill EnviroScience, LLC (EnviroScience) Limited Hazardous Building Materials Inspection Report (December 2016).
- C. Contract Considerations Section 01 20 00.
- D. Asbestos Abatement Section 02 82 13.
- E. Asbestos Roofing Abatement Section 02 82 14.
- F. Handling of Lighting Ballasts and Lamps Containing PCBs and Mercury Section 02 84 16.
- **G.** Hazardous Materials Abatement Drawings HM-01 HM-04.

### 1.2 SUMMARY OF WORK

- A. Work of this Section includes requirements for worker protection and waste disposal related to the Phase III Renovations and Additions Project (the "Work") involving lead-based paint (LBP)-coated building components and surfaces at Norwalk Community College located at 188 Richards Avenue in Norwalk, Connecticut (the "Site").
- **B.** The procedures referenced herein shall be utilized during work specified elsewhere that may impact building components coated with LBP. The following inaccessible painted component was assumed to be coated with LBP:
  - 1. Inaccessible structural beams.
- C. The Work impacting LBP may result in dust and debris exposing workers to levels of lead above the Occupational Safety and Health Administration's (OSHA) Action Level. Worker protection, training, and engineering controls referenced herein shall be strictly followed, until completion of exposure assessment with results indicating exposures below the "Action Level". This Section does not involve lead abatement, but identified worker protection requirements for trades involved in the demolition and disposal procedures if lead is involved in the demolition waste stream.
- D. Construction activities disturbing surfaces with lead-containing paint that are likely to be employed, such as demolition, sanding, grinding, welding, cutting and burning, have been known to expose workers to levels of lead in excess of the OSHA Permissible Exposure Limit (PEL). All work specified in the technical sections of the Contract Documents shall also be in conformance with this Technical specification section 02091 for Lead Paint Awareness.

### 1.3 DEFINITIONS

- **A.** The following definitions relative to LBP shall apply:
  - Action Level (AL) The allowable employee exposure, without regard to use of respiratory protection, to an airborne concentration of lead over an eight-hour time-weighted average (TWA) as defined by OSHA. The current action level is thirty micrograms per cubic meter of air (30 μg/m³).
  - 2. <u>Area Monitoring</u> The sampling of lead concentrations, which is representative of the airborne lead concentrations that may reach the breathing zone of personnel potentially exposed to lead.
  - 3. <u>Biological Monitoring</u> The analysis of a person's blood and/or urine, to determine the level of lead concentration in the body.
  - 4. CDC The Center for Disease Control
  - 5. <u>Change Room</u> An area provided with separate facilities for clean protective work clothing and equipment and for street clothes, which prevents cross-contamination.

- 6. <u>Component Person</u> A person employed by the Contractor who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions, and who has authorization to take prompt corrective measures to eliminate them as defined by OSHA.
- 7. Consultant Fuss & O'Neill EnviroScience
- 8. <u>EPA</u> United States Environmental Protection Agency
- 9. <u>Exposure Assessment</u> An assessment conducted by an employer to determine if any employee may be exposed to lead at or above the action level.
- 10. <u>High Efficiency Particulate Air (HEPA)</u> A type of filtering system capable of filtering out particles of 0.3 microns diameter from a body of air at 99.97% efficiency or greater.
- 11. HUD United States Housing and Urban Development
- 12. <u>Lead</u> Refers to metallic lead, inorganic lead compounds, and organic lead soaps. Excluded from this definition are other organic lead compounds.
- 13. <u>Lead Work Area</u> An area enclosed in a manner to prevent the spread of lead dust, paint chips, or debris resulting from lead containing paint disturbance.
- 14. Lead Paint Refers to paints, glazes, and other surface coverings containing a toxic level of lead.
- 15. MSHA Mine Safety and Health Administration
- 16. NARI National Association of The Remodeling Industry
- 17. NIOSH National Institute of Occupational Safety and Health
- 18. OSHA Occupational Safety and Health Administration
- Owner An employee or executive who has the principle responsibility for a process, program, or project.
- 20. <u>Permissible Exposure Limit (PEL)</u> The maximum allowable limit of exposure to an airborne concentration of lead over an eight (8)-hour TWA, as defined by OSHA. The current PEL is fifty micrograms per cubic meter of air (50 μg/m³). Extended workdays lower the PEL by the formula: PEL equals 400 divided by the number of hours of work.
- 21. Personal Monitoring Sampling of lead concentrations within the breathing zone of an employee to determine the 8 hour time weighted average concentration in accordance with OSHA Title 29 CFR, Parts 1910.1025 and 1926.62. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a sphere with a radius of 18-inches and centered at the nose or mouth of an employee.
- 22. Resource Conservation and Recovery Act (RCRA) RCRA establishes regulatory levels of hazardous chemicals. There are eight (8) heavy metals of concern for disposal: arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver. Six (6) of the metals are typically in paints, excluding selenium and silver.
- 23. SDS Safety Data Sheets
- 24. TWA Time Weighted Average
- 25. <u>Toxic Level of Lead</u> A level of lead, when present in dried paint or plaster, contains more than 0.50% lead by dry weight as measured by atomic absorption spectrophotometry (AAS) or 1.0 milligram per square centimeter (mg/cm²) as measured by on site testing utilizing an x ray fluorescence analyzer. (Term is specific to State of CT regulations and HUD guidelines only)
- 26. <u>Toxicity Characteristic Leaching Procedure (TCLP)</u> The United States Environmental Protection Agency (EPA) required sample preparation and analysis for determining the hazard characteristics of a waste material.

## 1.4 REGULATIONS AND STANDARDS

- **A.** The following regulations, standards, and ordinances of federal, state, and local agencies are applicable and made a part of this specification by reference:
  - 1. American National Standards Institute (ANSI)
    - a. ANSI 288.2 1980 Respiratory Protection
  - 2. Code of Federal Regulation (CFR)
    - a. Title 29 CFR, Part 1910.134 Respiratory Protection
    - b. Title 29 CFR, Part 1910.1025 Lead
    - c. Title 29 CFR, Part 1910.1200 Hazard Communication
    - d. Title 29 CFR, Part 1926.55 Gases, Vapors, Fumes, Dusts, and Mists
    - e. Title 29 CFR, Part 1926.57 Ventilation
    - f. Title 29 CFR, Part 1926.59 Hazard Communication in Construction
    - g. Title 29 CFR, Part 1926.62 Lead in Construction Interim Final Rule
    - h. Title 40 CFR, Parts 124 and 270 Hazardous Waste Permits
    - i. Title 40 CFR, Part 172 Hazardous Materials Tables and Communication Regulations
    - j. Title 40 CFR, Part 178 Shipping Container Specifications

- k. Title 40 CFR, Part 260 Hazardous Waste Management Systems: General
- I. Title 40 CFR, Part 261 Identification and Listing of Hazardous Waste
- m. Title 40 CFR, Part 262 Generators of Hazardous Waste
- n. Title 40 CFR, Part 263 Transporters of Hazardous Waste
- Title 40 CFR, Part 264 Owner and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
- p. Title 40 CFR, Part 265 Interim Statutes for Owner and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
- q. Title 40 CFR, Part 268 Lead Disposal Restrictions
- r. Title 49 CFR, Parts 170 180
- 3. Underwriters Laboratories, Inc. (UL)
  - a. UL586 1990 High Efficiency Particulate Air Filter Units

## 1.5 QUALITY ASSURANCE

## A. Hazard Communication Program

 The Contractor shall establish and implement a Hazard Communication Program as required by OSHA Title 29 CFR, Part 1926.59.

## B. Compliance Plan (Site-Specific)

- 1. The Contractor shall establish a written compliance plan, which is specific to the project site, to include the following:
  - A description of work activity involving lead including equipment used, material included, controls in place, crew size, employee job responsibilities, operating procedures, and maintenance practices.
  - b. Methods of engineering controls to be used to control lead exposure.
  - c. The proposed technology the Contractor will implement in meeting the PEL.
  - d. Air monitoring data documenting the source of lead emissions.
  - e. A detailed schedule for implementing the program, including documentation of appropriate supply of equipment, etc.
  - f. Proposed work practice which establishes proper protective work clothing, housekeeping methods, hygiene facilities, and practices.
  - g. Worker rotation schedule, if proposed, to reduce TWA.
  - h. A description of methods for informing workers of potential lead exposure.

### C. Hazardous Waste Management

- 1. The Contractor shall establish a Hazardous Waste Management Plan, which shall comply with applicable regulations and address the following:
  - a. Identification of hazardous wastes
  - b. Estimated quantity of waste to be disposed
  - Names and qualifications of each subcontractor who will be transporting, storing, treating, and disposing of wastes
  - d. Disposal facility location and 24-hour point of contact
  - e. Establish EPA state hazardous waste and identification numbers if applicable
  - f. Names and qualifications (experience and training) of personnel who will be working on site with hazardous wastes.
  - g. List of waste handling equipment to be used in performing the work to include cleaning, volume reduction, if applicable, and transport equipment
  - h. Qualifications of laboratory to be utilized for TCLP sampling and analysis
  - i. Spill prevention, containment, and countermeasure plan (SPCC)
  - j. Work plan and schedule for waste containment, removal, treatment, and disposal

## D. Medical Examinations

- 1. Before exposure to lead-contaminated dust, provide workers with a comprehensive medical examination as required by OSHA Title 29 CFR, Parts 1910.1025 and 1926.62.
- 2. The examination shall not be required if adequate records show that employees have been examined as required by OSHA Title 29 CFR, Part 1926.62 within the last year.
- 3. Medical examination shall include, at a minimum, approval to wear respiratory protection and biological monitoring.

#### E. Training

 The Contractor shall ensure that workers are trained to perform lead paint disturbing activities and disposal operations prior to the start of work, in accordance with OSHA Tile 29 CFR, Part 1926.62.

#### F. Respiratory Protection Program

- 1. The Contractor shall furnish each employee required to wear a negative pressure respirator with a respirator fit test at the time of initial fitting and at least once every six months thereafter, as required by OSHA Title 29 CFR, Part 1926.62.
- 2. The Contractor shall establish a Respiratory Protection Program in accordance with ANSI Z88.2, OSHA Title 29 CFR, Parts 1910.134 and 1926.62.

#### 1.6 SUBMITTALS

- **A.** The Contractor shall submit the following to the Consultant in one complete package prior to the preconstruction meeting and at least 10 business days before the start of the Work:
  - 1. Submit a schedule to the Owner and the Consultant, which defines a timetable for executing and completing the project, including work area preparations, removal, cleanup, and decontamination.
  - 2. Submit a current valid certificate of insurance.
  - 3. Submit the name and address of the hauling contractor and location of the landfill to be used. Also submit current valid operating permits and certificates of insurance for the transporter and landfill.
  - 4. Submit video documentation showing the existing building conditions prior to the start of work. The Contractor shall be responsible for all costs associated with damage to the building and its contents that are not shown on the video documentation.
  - 5. Submit the plans and construction details for the construction of the decontamination systems and the isolation of the work areas as may be necessary for compliance with this specification and applicable regulations.
  - 6. Submit copies of medical records for each employee to be used on the project, including results of biological monitoring and a notarized statement by the examining physician that such an examination occurred.
  - 7. Submit workers' valid training certificates.
  - 8. Submit record of successful respirator fit testing performed by a qualified individual within the previous six months, for each employee to be used on this project with the employee's name and social security number with each record.
  - 9. Submit the name and address of Contractor's blood lead testing lab, OSHA CDC listing, and certification in the State of Connecticut.
  - Submit detailed product information on all materials and equipment proposed for demolition work on this project.
  - 11. Submit pertinent information regarding the qualifications of the Project Supervisor (competent person) for this project, as well as a list of past projects completed.
  - 12. Submit a chain-of-command for the project.
  - 13. Submit a site-specific Emergency Action Plan for the project.
  - 14. Submit a written site-specific written Respiratory Protection Program for employees for the Work, including make, model and NIOSH approval numbers of respirators to be used at the Site (if applicable).
  - 15. No work on the Site will be allowed to begin until the Owner and the Consultant as listed herein accept the Pre-Construction Submittals. Any delay caused by the Contractor's refusal or inability to submit this documentation accurately, completely, and in a timely manner does not constitute a cause for change order or a time extension;
- **B.** The following shall be submitted to the Consultant during the Work:
  - 1. Results of personal air sampling
  - 2. Training and medical records for new employees to start Site work (24-hours in advance)
- **C.** The following shall be submitted to the Consultant at the completion of the Work:
  - 1. Copies of all air sampling results
  - Contractor logs
  - 3. Copies of manifests and receipts acknowledging disposal of all waste material from the project showing delivery date, quantity, and appropriate signature of landfill's authorized representative.

#### 1.7 PERSONAL PROTECTION

#### A. Exposure Assessment

- 1. The Contractor shall determine if any worker will be exposed to lead at or above the action level.
- 2. The exposure assessment shall identify the level of exposure a worker would be subjected to without respiratory protection.
- 3. The exposure assessment shall be achieved by obtaining personal air monitoring samples representative of a full shift at least (8-hour TWA).
- 4. During the period of the exposure assessment, the Contractor shall institute the following procedures for protection of workers:
  - a. Protective clothing shall be utilized
  - b. Respiratory protection
  - c. Change areas shall be provided
  - d. Hand washing facilities and shower
  - e. Biological monitoring
  - f. Training of workers

#### B. Respiratory Protection

- The Contractor shall furnish appropriate respirators approved by NIOSH/MSHA for use in atmospheres containing lead dust.
- 2. Respirators shall comply with the requirements of OSHA Title 29 CFR, Part 1926.62.
- 3. Workers shall be instructed in all aspects of respiratory protection.
- 4. The Contractor shall have an adequate supply of HEPA filter elements and spare parts on-site for all types of respirators in use.
- 5. The following minimum respirator protection for use during paint removal or demolition of components and surfaces with lead paint shall be the half-face air purifying respirator with a minimum of dual P100 filter cartridges for exposures (not in excess of 500 μg/m3 or 10 x PEL).

#### C. Protective Clothing

- 1. Personal protective clothing shall be provided for all workers, supervisors, and authorized visitors entering the work area.
- 2. Each worker shall be provided daily with a minimum of two complete disposable coverall suits.
- 3. Removal workers shall not be limited to two (2) coveralls, and the Contractor shall supply additional coveralls as necessary.
- 4. Under no circumstances shall anyone entering the abatement area be allowed to re-use a contaminated disposable suit.
- 5. Disposable suits (TYVEKTM or equivalent), and other personal protective equipment (PPE) shall be donned prior to entering a lead control area. A change room shall be provided for workers to don suits and other PPE with separate areas to store street clothes and personal belongings.
- 6. Eye protection for personnel engaged in lead operations shall be furnished when the use of a full-face respirator is not required.
- 7. Goggles with side shields shall be worn when working with power tools or a material that may splash or fragment, or if protective eye wear is specified on the SDS for a particular product to be used on the project.

#### 1.8 PERSONAL MONITORING

#### A. General.

 The Contractor shall be required to perform the personal air sampling activities during lead paint disturbing work. The results of such air sampling shall be posted, provided to individual workers and submitted to the Client as described herein.

#### B. Air Sampling.

Air samples shall be collected for the duration of the work shift or for 8-hours, whichever is less. Personal air samples need not be collected every day after the first day, if working conditions remain unchanged, but must be collected each time there is a change in removal operations, either in terms of the location or in the type of work. Sampling will be used to determine 8-hour TWA. The Contractor shall be responsible for personal air sampling as outlined in OSHA Title 29 CFR, Parts 1910.1025 & 1926.62.

2. Air sampling results shall be reported to individual workers in written form no more than 48-hours after the completion of a sampling cycle. The reporting document shall list each sample's result, sampling time and date, personnel monitored and their social security numbers, flow rate, sample duration, sample yield, cassette size, and analysts' name and company, and shall include an interpretation of the results. Air sample analysis results will be reported in µg/m3.

#### **C.** Testing Laboratory.

1. The Contractor's testing lab shall be currently participating in AIHA's Environmental Lead Laboratory Accreditation Program (ELLAP). The Contractor shall submit to the Engineer for review and acceptance, the name and address of the laboratory, certification(s) of AIHA participation, a listing of relevant experience in air lead analysis, and presentation of a documented Quality Assurance and Quality Control Program.

#### **PART 2 - PRODUCTS**

#### 2.1 GENERAL

- **A.** Any substitution in materials, equipment, or methods to those specified shall be approved by the Owner, Owner, and Consultant prior to use. Any requests for substitution shall be provided in writing to the Owner, Owner, and Consultant. The request shall clearly state the rationale for the substitution.
- **B.** Submit to the Owner, Owner, and Consultant product data of all materials and equipment and samples of all materials to be considered as an alternate.
- **C.** Product data shall consist of manufacturer; catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, SDS, and other standard descriptive data. Submittal data shall be clearly marked to identify pertinent materials, products or equipment and show performance characteristics and capacities.
- **D.** Samples shall be of sufficient size and quantity to clearly illustrate the functional characteristics of the product or material with integrally related parts and attachment devices.

#### 2.2 MATERIALS AND PRODUCTS

- **A.** Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer and the brand name and product technical description.
- **B.** Damaged or deteriorating materials shall not be used and shall be removed from the premises.
- **C.** The Contractor shall have available sufficient inventory or dated purchase orders for materials necessary for the project including protective clothing, respirators, filter cartridges, polyethylene (poly) sheeting of proper size and thickness, tape, and air filters.

#### D. Materials

- 1. Poly sheeting in a roll size to minimize the frequency of joints shall be delivered to the Site with factory label indicating 6-mil.
- 2. Poly disposable bags shall be 6-mil. Tie wraps for bags shall be plastic, five-inches long (minimum), pointed and looped to secure filled plastic bags.
- 3. Tape or spray adhesive will be capable of sealing joints in adjacent poly sheets and for attachment of poly sheeting to finished or unfinished surfaces of dissimilar materials and capable of adhering onto both dry and wet conditions, including use of amended water.
- Impermeable containers are to be used to receive and retain any lead-containing or contaminated
  materials until disposal at an acceptable disposal site. The containers shall be labeled in
  accordance with EPA and DOT standards.
- 5. HEPA-filtered exhaust systems shall be used during powered dust-generating abatement operations. The use of powered equipment without HEPA exhausts on this Site shall be prohibited.

#### 2.3 TOOLS AND EQUIPMENT

- **A.** Provide suitable tools for all lead disturbing operations.
- B. The Contractor shall have available power cables or sources such as generators (where required).
- **C.** Vacuum units, of suitable size and capacities for the project, shall have HEPA filter(s) capable of trap-ping and retaining 99.97% of all mono-dispersed particles of 0.3 micrometers in diameter.

#### **PART 3 - EXECUTION**

#### 3.1 PRE-CONSTRUCTION MEETING

- **A.** At least one week prior to the start of work, a Pre-Construction Meeting will be scheduled and must be attended by the Contractor and any Subcontractors. The assigned Contractor Site Supervisor must attend this meeting.
- **B.** The Contractor shall present a detailed project schedule and project submittal package at the Pre-Construction Meeting. Variations, amendments, and corrections to the presented schedule will be discussed, and the Owner and Consultant will inform the Contractor of any scheduling adjustments for this project.
- **C.** Following the Pre-Construction Meeting, the Contractor shall submit a revised schedule (if needed) no later than one week after the meeting.

#### 3.2 WORKER PROTECTION/TRAINING

- **A.** The Contractor shall provide appropriate training, respiratory and other PPE, and biological monitoring for each worker and ensure proper usage during potential lead exposure and the initial exposure assessment.
- B. Workers who will perform procedures must have completed one of the following training courses:
  - EPA Lead Abatement Supervisor (40-hours)
  - 2. EPA Lead Abatement Worker (32-hours)
  - 3. HUD/EPA course "Work Smart, Work Wet, and Work Clean to Work Lead Safe" (8-hours)
  - HUD/NARI course "The Remodeler's and Renovator's Lead Based Paint Training Program" (8-hours).
  - 5. HUD "Lead Safe Work Practices" (8-hours)

#### 3.3 CONTRACTOR'S RESPONSIBILITIES

- **A.** The Contractor shall be responsible for establishing and maintaining controls referenced herein to prevent dispersal of lead contamination from the lead work area.
- **B.** The Contractor shall also be responsible for conducting work with applicable federal, state, and local regulations as referenced herein.

# 3.4 WORKER HYGIENE PRACTICES (Required during initial exposure assessment and if results of air sampling are above OSHA Action Level)

- A. Work Area Entry.
  - 1. Workers shall don PPE prior to entering work area, including respiratory protection, disposable coveralls, gloves, headgear, and footwear.
- **B.** Work Area Departure.
  - While leaving respirators on, workers shall remove all gross contamination, debris, and dust from disposable coveralls and proceed to change room, and remove coveralls and footwear and place in hazardous waste disposal container.

- C. Hand washing Facilities.
  - 1. All workers must wash their hands and faces upon leaving the work area.

#### D. Equipment.

- All equipment used by workers inside the work area shall be wet-wiped or bagged for later decontamination before removal from the work area.
- E. Prohibited Activities.
  - Under no circumstances shall workers eat, drink, smoke, chew gum or tobacco, apply cosmetics, or remove their respirators in the work area.
- F. Shock Hazards.
  - The Contractor shall be responsible for using safe procedures to avoid electrical hazards. All temporary electrical wiring will be protected by ground fault circuit interrupters (GFCI).

# 3.5 LEAD WORK AREA (Required during initial exposure assessment and if results of air sampling are above OSHA Action Level)

**A.** The Contractor shall place lead warning signs at all entrances and exits from the work area. Signage shall be a minimum of 20" x 14" and shall state the following:

# DANGER LEAD WORK AREA MAY DAMAGE FERTILITY OR THE UNBORN CHILD CAUSES DAMAGE TO THE CENTRAL NERVOUS SYSTEM DO NOT EAT, DRINK OR SMOKE IN THIS AREA

- **B.** The Contractor shall designate a change room as specified in this Section. The change room shall consist of two layers of 6-mil thickness poly sheeting on the floor surface adjacent to the lead work area. The change room shall have separate storage facilities for street clothes to avoid cross-contamination.
- C. The Contractor shall provide potable water for hand and face washing and provide a portable shower unit.
- **D.** The Contractor shall place 6- mil poly drop cloths on floor/ground surfaces prior to beginning removal work to facilitate clean-up.

#### 3.6 WORK AREA CLEAN-UP

- **A.** The Contractor shall remove all loose chips and debris from floor surfaces and place in hazardous waste disposal bags.
- **B.** The Contractor shall clean using a HEPA-filter equipped vacuum the adjacent surfaces to remove dust and debris.
- C. Poly drop cloths shall be cleaned and properly disposed of general construction and demolition waste.

#### 3.7 WASTE DISPOSAL

- **A.** The Contractor's contractual liability shall be the proper disposal of all non-hazardous wastes generated at the Site in accordance with all applicable federal, state, and local regulations as referenced herein.
  - 1. Fuss & O'Neill EnviroScience did not collect a sample for TCLP analysis for disposal characterization of the anticipated waste stream based on results of limited testing for lead. Surface preparation work involving structural steel or limited removal of paint to facilitate new work specified elsewhere may impact lead paint. Any waste material resulting from surface preparation or paint removal from structural steel shall be presumed as hazardous waste for bid purposes. Paint associat4ed with inaccessible structural steel was assumed to contain lead-based paint. These metal components shall be recycled at a facility accepting lead-based painted materials. The Contractor shall be responsible for collecting a waste characterization sample for TCLP analysis, as is required by the disposal site. Results of the TCLP analysis shall be forwarded by

the Contractor to the Consultant prior to the waste being transported off of the Site. If the analytical result of the TCLP is > 5.0 milligrams per liter (mg/L), the waste shall be considered hazardous and transported and disposed as such. OR: If the analytical result of the TCLP is < 5.0 milligrams per liter (mg/L), the waste shall be considered non-hazardous and transported and disposed as such.

#### 3.8 CONSULTANT

- **A.** The Owner may retain a Consultant for the purpose of construction administration and project monitoring during demolition work at the Site.
- B. The Consultant will represent the Owner in all tasks of the project at the discretion of the Owner.

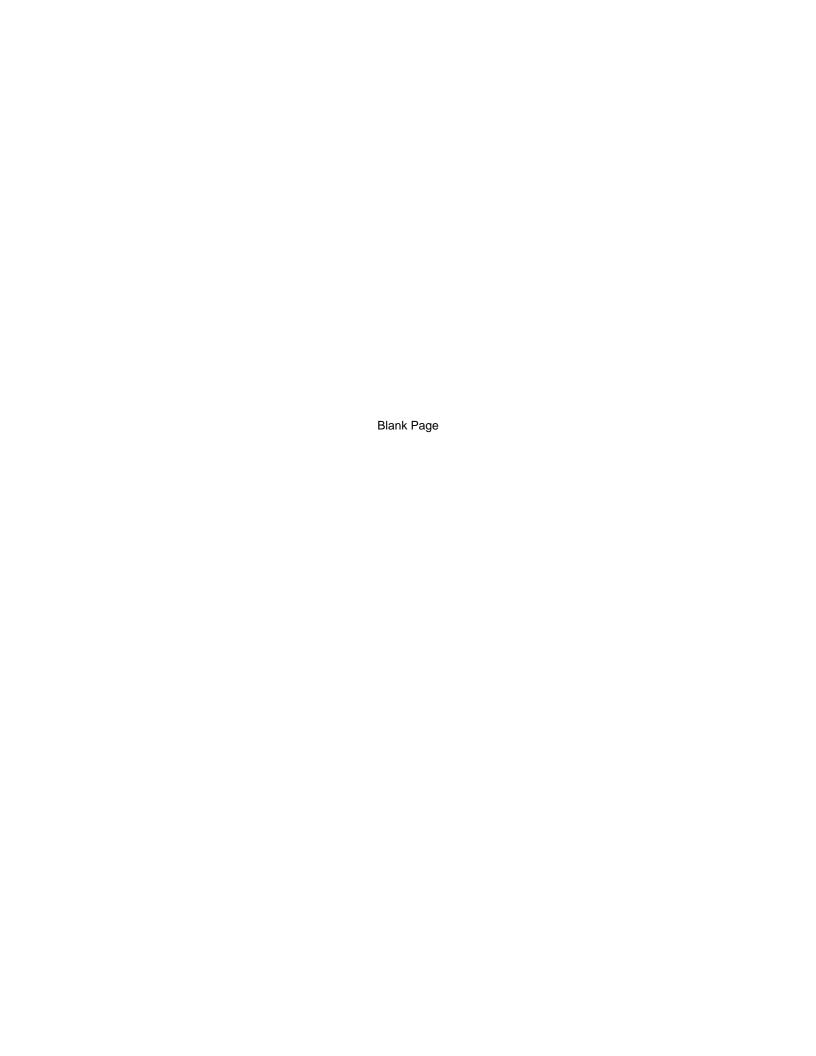
#### 3.9 CONSULTANT'S RESPONSIBILITIES

- A. The Consultant may conduct air sampling to ascertain the integrity of controls that protect the environmental from possible lead contamination. Independently, the Contractor shall monitor air quality within the work area to ascertain the protection of employees and to comply with OSHA regulations.
- B. The Consultant's project monitor may collect and analyze air samples during the following period:
  - 1. <u>Demolition Period</u>. If required, the Consultant's project monitor shall collect air samples on a daily basis during the work period. A sufficient number of area air samples shall be collected outside of the work area, to evaluate the degree of cleanliness or contamination of the environment during removal. Additional air samples may be collected inside the work area and decontamination system, at the discretion of the project monitor.
- C. If the project monitor determines that the building air quality has become contaminated from the project, they shall immediately inform the Contractor to cease all demolition operations and implement a work stoppage clean-up procedure. The Contractor shall conduct a thorough clean-up of the areas designated by the Consultant. No further removal work may occur until the Consultant has assessed that the air has been decontaminated.
- **D.** Pre-abatement and abatement air samples shall be collected as required to obtain a volume of 600 liters of air. Air samples shall be analyzed by NIOSH Method 7300 sampling protocol.

#### 3.10 CONSULTANT'S INSPECTION RESPONSIBILITIES

- **A.** Consultant may conduct inspections throughout the progress of the demolition project. Inspections shall be conducted to document the progress of the work, as well as the procedures and practices employed by the Contractor.
- B. The Consultant shall perform the following inspections during the course of abatement activities:
  - 1. Pre-commencement Inspection. Pre-commencement inspections shall be performed at the time requested by the Contractor. The Consultant shall be informed a minimum of 12-hours prior to the time the inspection is required. If deficiencies are identified during the pre-commencement inspection, the Contractor shall perform the necessary adjustments to obtain compliance.
  - Work Area Inspections. Work area inspections shall be conducted on a daily basis at the discretion
    of the Consultant. During the work inspections, the Consultant will observe the Contractor's
    removal methods and procedures, assess project progress, and inform the Contractor of specific
    remedial activities if deficiencies are noted.

**END OF SECTION 02 83 19** 



#### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- **A.** General Provisions of Contract, including General Supplementary Conditions shall apply to this Section.
- **B.** Fuss & O'Neill EnviroScience, LLC (EnviroScience) Limited Hazardous Building Materials Inspection Report (December 2016).
- C. Contract Considerations Section 01 20 00.
- D. Asbestos Abatement Section 02 82 13.
- E. Asbestos Roofing Abatement Section 02 82 14.
- F. Lead-Based Paint Awareness Section 02 83 19.
- **G.** Hazardous Materials Abatement Drawings HM-01 HM-04.

#### 1.2 SUMMARY OF WORK

- **A.** The abatement scope of work is work necessary to facilitate existing lighting fixtures specified to be demolished as part of the Phase III Renovations and Additions (the "Work") at Norwalk Community College located at 188 Richards Avenue in Norwalk, Connecticut (the "Site").
- B. Fluorescent Light Ballasts: Work of this Section includes, but is not necessarily limited to: all that is necessary for complete removal and disposal of Non-PCB diethylhexl phthalate (DEHP)-containing ballasts listed in Table 1. Work shall be performed as necessary to facilitate building renovations. Ballasts that are to be removed shall be recycled/disposed of as non-PCB containing if they have "No PCBs" labels.
- C. Fluorescent Lamps and Mercury Equipment: Work of this Section includes, but is not necessarily limited to: all that is necessary for complete removal and disposal/recycling/reclamation of presumed mercury-containing fluorescent lamps that exist in the building interior/exterior to be renovated as listed in Table 2. Fluorescent lamps that are to be removed shall be recycled/disposed of as universal wastes.
- **D.** The renovation scope of work is specified elsewhere in these Contract Documents. The Contractor shall coordinate this Section with other Sections for the actual quantities of the work required. Only those ballasts on light fixtures proposed for demolition require removal.
- **E.** The Contractor shall be responsible for verification of actual quantities of the abovementioned items requiring removal and disposal. This verification shall include an on-site walk-through of the work areas and visually inspecting ballasts for the presence of labels indicating "No PCBs". Ballasts without a label indicating "No PCBs" shall be disposed of/recycled as presumed PCB-containing.

Table 1
PCB/DEHP-Containing Light Ballasts Inventory

1 Objectiff Containing Light Ballasts inventory		
Туре	Estimated Quantity	
DEHP	152	
Total	152	

Table 2
Mercury-Containing Equipment Inventory

Туре	Estimated Quantity	
2' Light Tube	280	
High Intensity Discharge (HID) Light	24	

HANDLING OF LIGHTING BALLASTS AND LAMPS CONTAINING PCBS AND MERCURY Norwalk Community College, 188 Richards Ave, Norwalk, CT Page 2 of 4

Туре	Estimated Quantity
Compact Fluorescent Lamp (CFL)	10

#### 1.3 **REGULATIONS AND STANDARDS**

- A. The following regulations and standards of federal and state agencies apply to the disposal of ballasts, and are made part of this Specification by reference.
  - Toxic Substance Control Act (TSCA) (Title 40 CFR, Part 761).
  - 2. Comprehensive Environmental Response, Compensation, and Liability Act (Superfund Law).
  - Department of Transportation (DOT) Regulations DOT regulation HM-181 regulates transportation 3. of hazardous materials, including PCBs.
  - 4. Occupational Safety and Health Administration (OSHA). OSHA regulates workers' safety and exposure to a variety of chemicals including PCBs.
  - 5. Resource Conservation and Recovery Act (RCRA). RCRA regulates wastes which fail Toxic Characteristic Leaching Procedure (TCLP) and which contain PCBs at concentrations greater than 50 parts per million.
- B. The following regulations and standards of federal and state agencies apply to the disposal of universal waste (fluorescent lamps), and mercury-containing equipment are made part of this Specification by
  - EPA RCRA Regulations Title 40 CFR, Part 261, Subpart C. 1.
  - EPA RCRA 40 CFR Part 273. 2.
  - Comprehensive Environmental Response, Compensation, and Liability Act (Superfund Law). 3.
  - DOT Regulations Pipeline and Hazardous Materials Safety Administration regulation DOT Title 4. 49 CFR, Parts 100-185, as applicable.
  - OSHA Regulations Title 29 CFR, Parts 1910.1200 Hazard Communications and 1926.65. 5.

#### 1.4 PRE-CONSTRUCTION SUBMITTALS

- A. The Contractor shall submit to the Hazardous Materials Consultant the following submittals prior to start of the Work:
  - 1. Proposed transporter for PCB and non-PCB wastes generated as part of the project, including licenses as required, and insurance certificate.
  - 2. Proposed disposal/recycling facility proposed for PCB and non-PCB waste generated as part of the project, operating permit, and insurance certificate.
  - 3. Proposed transporter for mercury-containing universal wastes generated as part of the project, including licenses as required.
  - Proposed disposal/recycling/reclamation facility proposed for mercury-containing waste generated 4. as part of this project, operating permit, and insurance certificate.

#### **PART 2 - PRODUCTS**

#### 2.1 **MATERIALS AND EQUIPMENT**

- Deliver all materials in the original packages, containers, or bundles bearing the name of the manufacturer A. and the brand name and product technical description.
- В. Disposal drums shall be DOT 17-C or 17-H.
- C. Light tube and lamp boxes shall be provided by the reclamation facility. Only new boxes shall be used.

#### **PART 3 - EXECUTION**

#### 3.1 **BALLAST REMOVAL AND PACKAGING**

A. The Contractor shall remove all ballasts from light fixtures with care.

- **B.** The Contractor shall pack all ballasts in appropriately sized containers or drums with care, so as not to cause ballasts to leak as a direct result of removal and packing.
- **C.** The Contractor shall segregate all leaking ballasts from non-leaking ballasts, separately package leaking ballasts in plastic bags, and individually drum.
- **D.** The Contractor shall label all drums properly. The Contractor shall supply labels. Labels shall contain the following information:
  - 1. Drum contents
  - 2. DOT description
  - 3. Name, address, and telephone number of the Owner (i.e., the Generator)
  - 4. Emergency telephone numbers
  - 5. Date on which drum was filled with ballasts
  - 6. Class 9 label
- **E.** The Contractor shall ensure that no other material or waste is contained in the drums except the ballasts from fluorescent light fixtures.
- **F.** The Contractor shall not load drum with more than 750 pounds of gross weight.
- **G.** The Contractor shall not use any absorbent material to pack ballasts in drums.
- **H.** The Contractor shall not use any plastic liners in drums.
- I. Each drum shall be sealed and stored in a secure area to minimize inadvertent damage or vandalism.
- **J.** The ballasts will be removed by personnel wearing chemically resistant gloves, eye protection, and proper respiratory protection.

#### 3.2 BALLAST DISPOSAL

- At the completion of the removal phase of the project, a transporter licensed to haul either PCB or non-PCB waste shall be contracted for disposal of the waste generated by the project work. Chain of custody records shall be maintained which include the date of pickup, number of drums, name of the transporter, and destination of waste for disposal. The Contractor shall be responsible for all disposal costs associated with the waste generated during this project.
- **B.** The Contractor shall provide a Certificate of Recycling and Disposal (CRD) pursuant to EPA Title 40 CFR, Part 761, Subpart K.
- C. The Contractor shall provide waste shipment records and disposal manifests for all PCB and non-PCB wastes generated and disposed from the project site. The Owner shall be provided sufficient time to identify agent for signatures on waste documentation. Contractor shall provide waste manifest to generation and destination state as required and provide Owner (Generator copy to agent signing manifests).

#### 3.3 COLLECTION AND CONTAINMENT OF MERCURY LAMPS AND DEVICES

**A.** All fluorescent lamps and devices to be removed are to be considered mercury-containing. Lamps are to be handled by personnel wearing gloves and eye protection for protection against glass breakage, and proper respiratory protection. Lamps are to be stored unbroken in DOT-approved waste containers that protect the lamps against breakage.

#### 3.4 STORAGE AND DISPOSAL/RECYCLING OF MERCURY LAMPS AND DEVICES

**A.** Each container shall be sealed and stored in a secure area to minimize inadvertent damage or vandalism. Each lamp or a container or package in which such lamps are contained must be labeled or marked clearly with one of the following phrases: "Universal Waste -- Lamp(s)," or "Waste Lamp(s)," or "Used Lamp(s)".

- **B.** At the completion of the mercury removal phase of the project, a transporter licensed to haul mercury-containing waste shall be contracted for disposal/recycling of the mercury waste. Chain-of-custody records shall be maintained which include the date of pickup, number of containers, name of mercury transporter, and destination of mercury waste disposal. The Contractor shall be responsible for all disposal/recycling costs associated with the mercury waste generated during this project.
- C. The Owner shall be provided a minimum of 72-hour notice of requirement for signature to identify agent for signatures on waste documentation. Contractor shall provide waste manifest to generation and destination state as required and provide Owner (Generator copy to agent signing manifests) and Hazardous Materials Consultant.

**END OF SECTION 02 84 16** 

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION OF WORK

- A. Provide concrete formwork wherever necessary to confine concrete and shape it to required dimensions in accordance with the Contract Documents. The Contract Documents are as defined in the "AGREEMENT". The "GENERAL CONDITIONS" shall apply to all work under the Contract.
- B. Provide mock-up of smooth and architectural finishes prior to beginning work as described in Section 03 30 00.

#### 1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

- B. Miscellaneous metal fabrications (concrete, inserts)...... Section 05 50 00
- C. Mechanical and Electrical items...... Division 23

#### 1.03 RELATED SECTIONS

- A. Concrete Reinforcement...... Section 03 20 00
- C. General Requirements...... Division 1
- D. Earthwork..... Division 31

#### 1.04 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- A. American Concrete Institute (ACI) standards, latest editions.
  - 1. ACI 301 Specifications for Structural Concrete for Buildings.

2. ACI 347 Guide to Formwork for Concrete.

#### 1.05 DESIGN REQUIREMENTS

- A. The design and engineering of the formwork, as well as its construction, is the responsibility of the Contractor.
- B. Design formwork in accordance with ACI 347.

#### 1.06 SUBMITTALS

#### A. Product Data

Submit manufacturers' information for the following:

- 1. Ties, each type and where to be used
- 2. Form-release agent. Form-release agent to be submitted for review only.

#### B. Shop Drawings

- Prepare and submit formwork shop drawings and calculations prepared and sealed by a Professional Engineer licensed in the State of Connecticut for review.
- 2. Exposed concrete indicated on the Drawings as "Architectural Concrete" or "Architectural Finish" shall have the formwork designed and shop drawings submitted for review to ensure tightness and prevention of leakage. Formwork is to be designed to limit deflections.
- 3. Submit method of producing special finish (eg exposed aggregate, sandblast, etc).

## C. Quality Control Submittals

1. Contractor Qualifications

Provide proof of Formwork Installer qualifications specified under "Quality Assurance".

#### 1.07 QUALITY ASSURANCE

A. Qualifications

Company specializing in performing the Work of this Section shall have three years minimum experience.

#### B. Regulatory Requirements

#### 1. Building Code

Work of this Section shall conform to all requirements of the Building Code. Where more severe requirements than those contained in the Building Code are given in this Section and ACI 347, the requirements of this Section and ACI 347 shall govern.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

#### A. Protection

- 1. Protect formwork materials before, during and after installation.
- 2. Protect installed work and materials of other trades.

## B. Replacement

1. Repair or replace damaged formwork as approved by the *Owner*.

#### PART 2 - PRODUCTS

#### 2.01 MATERIALS

#### A. Rough Formwork

Shall be Commercial Douglas Fir, DFPA: 5/8" thick minimum or modular metal units.

# B. Release Agent

VOC compliant material and commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

#### C. Form Ties

- 1. Form ties for exposed concrete shall be adjustable.
- 2. Form ties for exposed concrete and concrete to receive membranes shall be a break-off type and leave no metal closer than  $1^{1}/_{2}$ " to the surface.

- 3. Form ties for concrete stated in 2 above shall be free of devices which leave holes or depressions larger than 7/8" back of exposed surface.
- 4. Wire ties not permitted.

#### PART 3 - EXECUTION

#### 3.01 PREPARATION OF FORMWORK SURFACES

- A. Clean all surfaces of forms and embedded items of any accumulated mortar or grout from previous concreting and other foreign material before concrete is placed in them. Repair or replace any formwork as required.
- B. Before placing either reinforcing steel or concrete, cover the surfaces of the rough or overlaid plyform formwork (when used) with an approved form release agent that will effectively prevent absorption of moisture, prevent bond with the concrete, and which will not stain the concrete surfaces. Material shall be carefully applied at the amount recommended by the release agent manufacturer to obtain the desired finish. Do not apply oil or release agents on formwork for concrete to receive coatings such as membrane waterproofing, plaster, or additional concrete (such as at construction joints). Follow manufacturer's recommendations for alternatives. Do not allow excess form coating material to stand in puddles in the forms nor allow coating to come in contact with hardened concrete against which fresh concrete is to be placed.

#### 3.02 CONSTRUCTION AND DETAILS

- A. Adequately support and substantially brace formwork to hold lines and shape.
- Formwork shall be tight jointed to prevent leakage of mortar from the concrete.
- C. Place chamfer strips in the corners of forms to produce beveled edges (chamfers) on permanently exposed surfaces (such as exposed columns). Do not provide beveled edge for interior corners of such surfaces and where members are flush with partitions or walls, unless required by Drawings or specified elsewhere.
- D. Set slab-forms with camber of 1/4" per 10 feet of span to maintain tolerances. For two way slabs the lesser span dimension shall govern.
- E. Provide positive means of adjustment (wedges or jacks) for shores and struts to take up all settlement during concrete placing operations. Fasten wedges used for final adjustment of forms prior to concrete placement in position after final check. Securely brace forms against lateral deflection.

- F. Provide mud sills where shores rest on compressible materials.
- G. Provide temporary openings to permit cleaning and inspection. Provide ample time for proper inspection before placement of concrete.
- H. Provide "Rough Form Finish" for surfaces not exposed to view. Use plywood or metal forms coated with a release agent.
- I. Provide "Smooth Form Finish" (and/or Architectural Finish", "Textured Finish", if shown on Drawings) for surfaces exposed to view, keeping the number of seams to a practical minimum. Items indicated as "Architectural Concrete" or Architectural Finish" shall use specially designed formwork to attain the desired finish.
- J. Form holes for pipes, pipe sleeves, electric outlets, electric conduits, etc. as required. Construct woodforms for wall forms to facilitate loosening, if necessary, to counteract swelling of forms.
- K. Provide runways for moving equipment with struts or legs, which shall be supported directly on the formwork or structural member without resting on the reinforcing steel.
- L. Provide for rebates, reglets, grooves keys, pockets, ground nailers, projections and other built-in work prior to placement of concrete. Install reglets as per manufacturer's instructions.
- M. Install dovetail slots, concrete inserts, and other metal fabrications. Secure to inside forms and space as specified in Section 05 50 00 or as shown on Drawings.
- N. At construction joints, contact surface of the form sheathing for flush surfaces exposed to view shall overlap the hardened concrete in the previous placement by not more than 1". The forms shall be held against the hardened concrete to prevent offsets or loss of mortar at the construction joint and to maintain a true surface.
- O. Form accessories to be partially or wholly embedded in the concrete, such as ties and hangers, shall be of a commercially manufactured type. Use of non-fabricated wire is not permitted. Construct form ties so that the ends or end fasteners can be removed without causing appreciable spalling at the faces of the concrete. After the ends or end fasteners of the form ties have been removed, terminate the embedded portion of the ties not less than 2 diameters or twice the minimum dimension of the tie from the formed faces of concrete to be permanently exposed to view, except that in no case shall this distance be less than 3/4". When the formed face of the concrete is not to be permanently exposed to view, form ties may be cut off flush with the formed surfaces.
- P. Carefully check all forms before placement of concrete. Give special care to suspended first floor slabs resting on compressible material to prevent settlement.

Q. Notify the Engineer of Record if openings are required but not shown on the Drawings, who will issue instructions accordingly.

#### 3.03 REMOVAL OF FORMS AND SHORING

- A. Remove forms in such a manner as to assure the complete safety of the structure. In no case remove forms or shoring supporting the weight of concrete in beams, slabs or structural members until the members have reached the minimum compressive strength specified on the Drawings or as permitted by the Engineer of Record.
- B. Formwork for columns, walls, sides of beams, and other parts not supporting the weight of the concrete may be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations and as required by C below. For normal temperature conditions, this shall be a minimum of 12 hours. For cold weather conditions, this shall be increased to 24 hours. Concrete shall remain protected at all times.
- C. When repair of surface defects or finishing is required at an early age, remove forms as soon as the concrete has hardened sufficiently to resist damage from removal operations.
- D. Remove top forms on sloping surfaces of concrete as soon as the concrete has attained sufficient stiffness to prevent sagging. Perform any needed repairs or treatment required on such sloping surfaces at once and follow it with the specified curing.
- E. Loosen wood forms for wall openings as soon as this can be accomplished without damage to the concrete.
- F. Proper safe shoring, number of shores, adequacy, size and location of these shores and forms shall be in accordance with acceptable good construction practice and it is the sole responsibility of the Contractor to provide safe conditions at all times during stripping.

#### 3.04 TOLERANCES

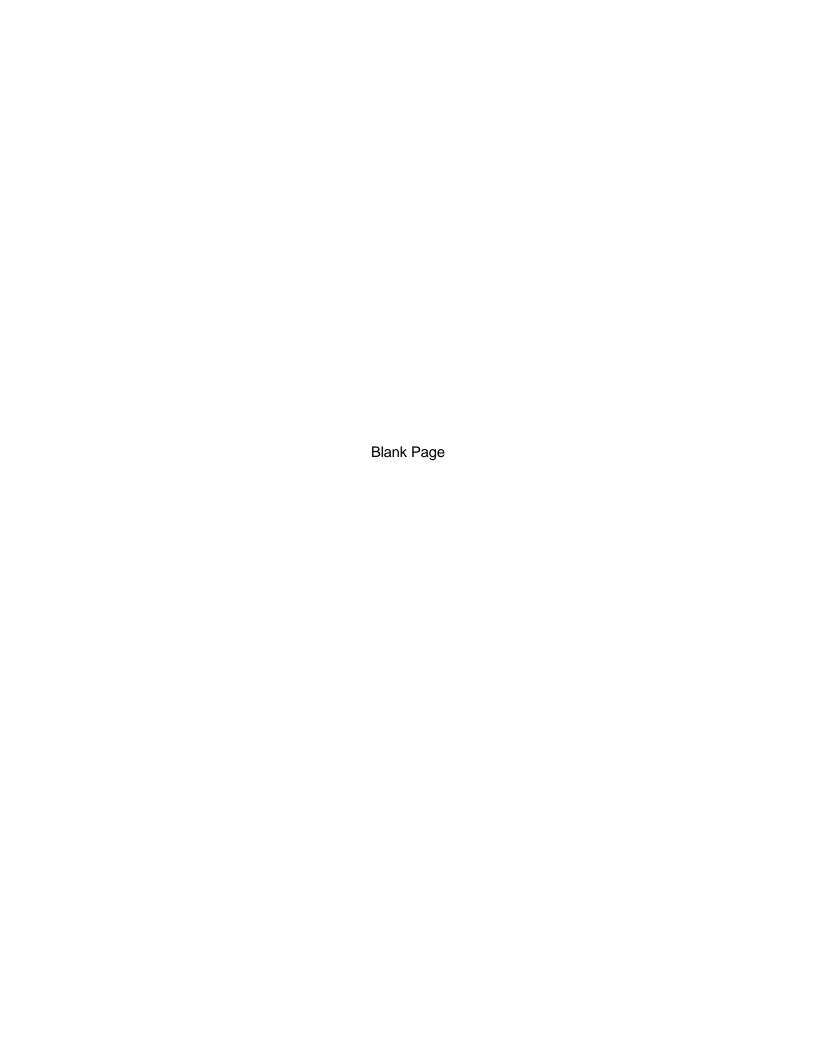
- A. Construct formwork so that concrete surfaces will conform to the tolerance limits listed in Table 4.3.1 of ACI 301.
- B. Establish and maintain in an undisturbed condition and until final completion and acceptance of the project sufficient control points and bench marks to be used for reference purposes to check tolerances.

- C. Regardless of the tolerances listed, do not extend any portion of the concrete work beyond the lot or street line.
- D. Formwork for "Architectural" Concrete shall not deflect more than 1/8" over the height of the member.

#### 3.05 INSPECTION

- A. Under the requirements of the Building Code, the Owner will designate an Engineer for Controlled Inspection to inspect formwork, including shores, braces, and other supports, to verify the sizes of concrete members being formed. The Engineer will make inspections prior to placement of steel, after placement, and during placement of concrete.
- B. Under the requirements of the Building Code, the Contractor's person superintending the work shall inspect the forms for conformance with form design drawings when such drawings are required. Make inspections prior to placement of steel and subsequently periodically after placement and during placement of concrete to detect incipient problems.
- C. During and after concrete placement, check elevations, camber, and vertical alignment of formwork systems using tell-tale devices.
- D. Keep a record of all inspections, the name of the persons making them, and the name of the foreman in charge of formwork at the site. Submit to the *Owner's* representative on the site a copy of the inspection records prior to each concrete placement.

END OF SECTION 03 10 00



This specification is intended to address the use of anchors for safety-related applications, such as structural connections, earthquake bracing, guard rails, mechanical and electrical equipment support, piping and ductwork support and bracing, cladding and façade connections, or rebar doweling.

#### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Section Includes: Drilled in anchors for concrete and masonry.
- B. Related Sections:
  - Division 3 Concrete Sections.
  - 2. Divison 4 Masonry Sections.
  - Division 5 Metals Sections.
  - 4. Division 22 Hangers and Supports Section.
  - 5. Division 23 Hangers and Supports Section.
  - 6. Division 26 Hangers and Supports Section.

#### 1.02 SUBMITTALS

- A. General: Submit in accordance with *Conditions of the Contract* and Division 1 Submittal Procedures Section.
  - 1. Product specifications with recommended design values and physical characteristics for epoxy dowels, expansion and undercut anchors.
  - 2. Samples: Representative length and diameters of each type anchor shown on the Drawings.
  - 3. Quality Assurance Submittals:
    - Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
    - b. Certificates:
      - ICC ES Evaluation Reports.
  - 4. Manufacturer's installation instructions.
  - 5. Installer Qualifications & Procedures: Submit installer qualifications as stated in Section 1.03.B. Submit a letter of procedure stating method of drilling, the product proposed for use, the complete installation procedure, manufacturer training date, and a list of the personnel to be trained on anchor installation.
- B. Closeout Submittals: Submit the following:
  - Record Documents: Project record documents for installed materials in accordance with Division 1 Closeout Submittals Section.

#### 1.03 QUALITY ASSURANCE

#### A. Installer Qualifications:

- 1. Drilled-in anchors shall be installed by a contractor with at least three years of experience performing similar installations.
- B. Installer Training: Conduct a thorough training with the manufacturer or the manufacturer's representative for the contractor on the project. Training to consist of a review of the complete installation process for drilled-in anchors, to include but not limited to:
  - 1. hole drilling procedure
  - 2. hole preparation & cleaning technique
  - 3. adhesive injection technique & dispenser training / maintenance
  - 4. rebar dowel preparation and installation
  - proof loading/torquing
- C. Certifications: Unless otherwise authorized by the Engineer, anchors shall have one of the following certifications:
  - 1. ICC ES Evaluation Report indicating conformance with current applicable ICC ES Acceptance Criteria.

#### 1.04 DELIVERY, STORAGE AND HANDLING

- A. General: Comply with Division 1 Section–Product Storage and Handling Requirements.
  - 1. Store anchors in accordance with manufacturer's recommendations.

#### **PART 2 - PRODUCTS**

#### 2.01 MATERIALS

- A. Fasteners and Anchors:
  - 1. Bolts and Studs: ASTM A307; ASTM A449 where "high strength" is indicated on the Drawings.
  - 2. Carbon and Alloy Steel Nuts: ASTM A563.
  - 3. Carbon Steel Washers: ASTM F436.
  - 4. Carbon Steel Threaded Rod: ASTM A36; or ASTM A193 Grade B7; or ISO 898 Class 5.8.
  - 5. Wedge Anchors: ASTM A510; or ASTM A108.
  - 6. Stainless Steel Bolts, Hex Cap Screws, and Studs: ASTM F593.
  - 7. Stainless Steel Nuts: ASTM F594.
  - 8. Zinc Plating: ASTM B633.
  - 9. Hot-Dip Galvanizing: ASTM A153.
  - 10. Metric Anchor Bolts, Screws, and Studs: ISO 898 Part 1.

- 11. Metric Anchor Nuts: EN 24033.
- 12. Metric Anchor Stainless Steel Bolts, Screws, and Studs: ISO 3506 Part 1.
- 13. Metric Anchor Stainless Steel Nuts: ISO 3506 Part 2.
- 14. Reinforcing Dowels: ASTM A615

#### 2.02 DRILLED-IN ANCHORS

- A. Wedge Anchors: Wedge type, torque-controlled, with impact section to prevent thread damage complete with required nuts and washers. Provide anchors with length identification markings conforming to ICC ES AC01 or ICC ES AC193. Type and size as indicated on Drawings.
  - 1. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors with zinc plating in accordance with ASTM B633, Type III Fe/Zn 5 (SC1).
  - 2. Exterior Use: As indicated on the Drawings, provide stainless steel anchors. Stainless steel anchors shall be AISI Type 304 and/or 316 stainless steel provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener. Stainless steel nuts shall conform to ASTM F594 unless otherwise specified. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
  - 3. Where anchor manufacturer is not indicated, subject to compliance with requirements and acceptance by the Engineer, provide the following:
    - Hilti Kwik Bolt TZ, ICC ESR-1917 (carbon steel and AISI Type 304 Stainless Steel).
    - b. Power Stud + SD2 (carbon steel and AISI Type 304 Stainless Steel).
    - c. Simpson Strong-Tie Strong-Bolt 2 (carbon steel and AISI Type 304 Stainless Steel).
- B. Heavy Duty Metric Undercut Anchors: Bearing-type. Installed anchor shall have a minimum tension bearing area in the concrete, measured as the horizontal projection of the bearing surface, not less than two times the net tensile area of the anchor bolt. The installed anchor shall exhibit a form fit between the bearing elements and the undercut in the concrete. Type and size as indicated on Drawings.
  - 1. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors manufactured from materials conforming to ISO 898 Part 1, with zinc plating equivalent to ASTM B633, Type III Fe/Zn 5 (5μm min.).
  - 2. Exterior Use: As indicated on the Drawings, provide sherardized or stainless steel anchors. Sherardized anchors shall be manufactured from materials conforming to ISO 898 Part 1 and having corrosion resistance equivalent to ASTM A153 with sherardized dry diffusion zinc coating (50 m min.). Stainless steel anchors shall be manufactured from materials conforming to ISO 3506 Part 1 and having corrosion resistance equivalent to AISI [Type 316] stainless steel. Stainless steel anchors shall be provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener. All nuts shall conform to ISO 3506 Part 2

- unless otherwise specified. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
- 3. Where anchor manufacturer is not indicated, subject to compliance with requirements and acceptance by the Engineer, provide the following:
  - Hilti HDA, ICC ESR-1546.
  - b. Power Atomic + Undercut, ICC-ES, ESR-3067.
  - c. Simpson Strong-Tie Torq-Cut, ICC-ES ESR-2705.
- C. Cartridge Injection Adhesive Anchors: Threaded steel rod, inserts or reinforcing dowels, complete with nuts, washers, polymer or hybrid mortar adhesive injection system, and manufacturer's installation instructions. Type and size as indicated on Drawings.
  - Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel threaded rods conforming to ASTM A36, ASTM A 193 Type B7 or ISO 898 Class 5.8 with zinc plating in accordance with ASTM B633, Type III Fe/Zn 5 (SC1).
  - 2. Exterior Use: As indicated on the Drawings, provide stainless steel anchors. Stainless steel anchors shall be AISI Type 316 stainless steel provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener. All nuts shall conform to ASTM F594 unless otherwise specified. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
  - 3. Reinforcing dowels shall be A615 Grade 60.
  - 4. Where anchor manufacturer is not indicated, subject to compliance with requirements and acceptance by the Engineer, provide the following:
    - a. Hilti HAS threaded rods with HIT-HY 200 Safe Set System using Hilti Hollow Drill Bit System for anchorage to concrete, ICC ESR-3187.
    - b. Power AC100+Gold, ICC ESR-2582.
    - c. Simpson Strong-Tie SET-XP, ICC ESR-2508.

#### **PART 3 - EXECUTION**

#### 3.01 INSTALLATION

- A. Cast-In-Place Bolts: Use templates to locate bolts accurately and securely in formwork.
- B. Drilled-In Anchors:
  - Drill holes with rotary impact hammer drills using hollow drill bit system, or core drills using diamond core bits. Drill bits shall be of diameters as specified by the anchor manufacturer. Unless otherwise shown on the Drawings, all holes shall be drilled perpendicular to the concrete surface.
    - a. Cored Holes: Where anchors are permitted to be installed in cored holes, use core bits with matched tolerances as specified by the manufacturer. Properly clean cored hole per manufacturer's instructions.

- b. Embedded Items: Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Exercise care in coring or drilling to avoid damaging existing reinforcing or embedded items. Notify the Engineer if reinforcing steel or other embedded items are encountered during drilling. Take precautions as necessary to avoid damaging prestressing tendons, electrical and telecommunications conduit, and gas lines.
- c. Base Material Strength: Unless otherwise specified, do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
- 2. Perform anchor installation in accordance with manufacturer instructions.
- 3. Undercut Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in part to be fastened. Set anchors to manufacturer's recommended torque, using a torque wrench. Following attainment of 10% of the specified torque, 100% of the specified torque shall be reached within 7 or fewer complete turns of the nut. If the specified torque is not achieved within the required number of turns, the anchor shall be removed and replaced unless otherwise directed by the Engineer.
- 4. Cartridge Injection Adhesive Anchors: Clean all holes per manufacturer instructions to remove loose material and drilling dust prior to installation of adhesive. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive. Follow manufacturer recommendations to ensure proper mixing of adhesive components. Sufficient adhesive shall be injected in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface. Shim anchors with suitable device to center the anchor in the hole. Do not disturb or load anchors before manufacturer specified cure time has elapsed.
- 5. Observe manufacturer recommendations with respect to installation temperatures for cartridge injection adhesive anchors and capsule anchors.

#### 3.02 REPAIR OF DEFECTIVE WORK

A. Remove and replace misplaced or malfunctioning anchors. Fill empty anchor holes and patch failed anchor locations with high-strength non-shrink, nonmetallic grout. Anchors that fail to meet proof load or installation torque requirements shall be regarded as malfunctioning.

#### 3.03 FIELD QUALITY CONTROL

- A. Periodic Special Inspection of post-installed anchors shall be provided the authority. This service shall be performed by personnel independent of the Manufacturer or Contractor so as to prevent a conflict of interest.
- B. Testing: 5% of each type and size of drilled-in anchor shall be proof loaded by the independent testing laboratory. Adhesive anchors and capsule anchors shall not be torque tested unless otherwise directed by the Engineer. If more than 10% of the tested anchors fail to achieve the specified torque or proof load within the limits as defined on the Drawings, all anchors of the same diameter and type as the failed anchor shall be tested, unless otherwise instructed by the Engineer.
  - 1. Tension testing should be performed in accordance with ASTM E488.
  - 2. Torque shall be applied with a calibrated torque wrench.
  - Proof loads shall be applied with a calibrated hydraulic ram. Displacement of adhesive and capsule anchors at proof load shall not exceed D/10, where D is the nominal anchor diameter.
- C. Minimum anchor embedments, proof loads and torques shall be as shown on the Drawings.

**END OF SECTION** 

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION OF WORK

A. Provide and install all reinforcement and associated items required for cast-in-place in accordance with the Contract Documents. The Contract Documents are as defined in the "AGREEMENT". The "GENERAL CONDITIONS" shall apply to all work under the Contract.

#### 1.02 RELATED SECTIONS

A.	Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings	
B. 19	Construction Waste Management	Section 01 74
C.	Construction IAQ Management40	Section 01 57
D.	Concrete Formwork00	Section 03 10
E.	Cast-in-Place Concrete	Section 03 30

General Requirements......Division 1

#### 1.03 REFERENCES

F.

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

A. American Society of Testing and Materials (ASTM) standards, latest editions.

A82	Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.		
A184	Standard Specification for Fabricated Deformed Steel Bar Mats for		
	Concrete Reinforcement.		
A185	Standard Specification for Steel Welded Wire Reinforcement, Plain, for		
	Concrete.		
A496	Standard Specification for Steel Wire, Deformed, for Concrete		
	Reinforcement.		

A497	Standard Specification for Steel Welded Wire Reinforcement, Deformed,
	for Concrete.
A615	Standard Specifications for Deformed and Plain Billet-Steel Bars for
	Concrete Reinforcement.
A706	Standard Specifications for Low-Alloy Steel Deformed and Plain Bars for
	Concrete reinforcement
A775	Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
A884	Standard Specifications for Epoxy-coated Wires and Welded Wire
	Reinforcement.

- B. American Concrete Institute (ACI) standards, latest editions.
  - ACI 301 "Specification for Structural Concrete for Buildings."
  - ACI 315 "Details and Detailing of Concrete Reinforcement."
  - ACI 318-02 "Building Code Requirements for Structural Concrete."
- C. "Placing Reinforcing Bars CRSI-WCRSI Recommended Practices", latest edition. Concrete Reinforcing Steel Institute.
- D. "Structural Welding Code Reinforcing Steel" D1.4 American Welding Society (AWS).
- E. "Near-White Blast Cleaning" SSPC-SP10 Steel Structures Painting Council (SSPC).

#### 1.04 DESIGN REQUIREMENTS

- A. In lieu of placing reinforcement bars, the contractor has the option of using welded wire reinforcement (WWR).
  - 1. WWR must be demonstrated to the satisfaction of the engineer of record that they are of equivalent strength to the reinforcing bars that are being substituted.
  - 2. As per ACI 318, yield strength greater than 60,000 psi may be used (for WWR) provided the yield strength is measured at a strain of 0.0035 in./in. in accordance with ACI code requirements.

#### 1.05 SUBMITTALS

A. Product Data

Submit manufacturers' information for the following:

1. Steel welded wire fabric

- Steel welded wire reinforcement.
- 3. Supports
- 4. Mechanical connectors

### B. Shop Drawings

- 1. Immediately after award of Contract, prepare shop drawings showing all fabrication dimensions and locations for placing of the reinforcing steel and accessories. Shop Drawings are to be prepared by a rebar detailer.
- 2. Follow detailing recommendations of ACI 315.
- Submit drawings gradually and not all at the same time so that sufficient time is allowed for checking and approval. Improperly prepared and incomplete shop drawings will be disapproved without review.
- 4. Shop drawings will be checked for size of material and spacing by the Engineer of Record, which shall not render the Engineer responsible for any errors in construction dimensions, quantities, bends, etc. that have been made in preparation of the shop drawings. The Contractor shall assume full responsibility for the correctness of quantities, dimensions and fit.
- 5. Do not order or deliver reinforcement to job site prior to approval of drawings.
- 6. Indicate location of epoxy-coated bars on the drawings.

#### C. Quality Control Submittals

#### 1. Certificates

- a. Submit certificate stating that reinforcement meets or exceeds the specified requirements.
- b. Submit certification that properly identifies the number of each batch of epoxy coating material used on the project, material, quantity represented, date of manufacture, name and address of manufacturer and a statement that the supplied epoxy-coated reinforcing bars meet the requirements of this specification and the requirements of ASTM A775 including Annex A1.
- c. If WWR is used, provide certificate from the manufacturer that WWR meets or exceeds the requirements specified in ACI 318 and provide

calculations that it is of equivalent strength to the reinforcing bars that are being substituted.

#### 2. Contractor Qualifications

Provide proof of Installer and Detailer qualifications specified under "Quality Assurance".

#### 1.06 QUALITY ASSURANCE

#### A. Qualifications

- Rebar Installer: Company specializing in performing the Work of this Section shall have three years minimum experience on successful projects of similar size.
- 2. Rebar Detailer: Company shall be specialized in the detailing of reinforcing bar shop drawings with a minimum of three years experience.

#### B. Regulatory Requirements

#### Building Code

Work of this section shall conform to all requirements of the Building Code, "Identification of metal-reinforcement", deliveries will be rejected unless:

- All reinforcing bars are identifiable as to point of origin, grade of steel and size.
- b. All bundles or rolls of cold drawn steel wire reinforcement are securely tagged to identify the manufacturer, the grade of steel and the size.

Where more severe requirements than those contained in the Building Code are given in this Section and ACI 318, the requirements of this Section and ACI 318 shall govern.

#### 2. Industry Standards

Details of Concrete reinforcement not covered herein shall be in accordance with "Building Code Requirements for Reinforced Concrete" (ACI 318) and "Details and Detailing of Concrete Reinforcement" (ACI 315), latest editions and the Concrete Reinforcing Steel Institute Manual on "Placing Reinforcing Bars" (CRSI).

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store in location to prevent rusting, etc.
- B. Protect reinforcement before, during, and after installation.
- C. Insure proper identification after bundles are broken.
- D. Epoxy-Coated Reinforcing Bars
  - Equipment for handling epoxy-coated bars shall have protected contact areas. Lift Bundles of coated bars at multiple pick-up points to minimize bar-to-bar abrasion from sags in the bundles.
  - 2. Do not drop or drag coated bars or bundles of coated bars. Store coated bars on protective cribbing.
  - 3. Fading of the color of the coating shall not be cause for rejection of epoxy-coated reinforcing bars. Coating damage due to handling, shipment, and placing need not be repaired in cases where the damaged areas is 0.1 in<sup>2</sup> or smaller. Repair damaged areas larger than 0.1 in<sup>2</sup> in accordance with Article 2.02. The maximum amount of damage, including repaired and un-repaired areas, shall not exceed 2% of the surface area of each bar. Bars with greater than 2% damaged areas will be rejected.
- E. WWR is shipped in two forms; rolls or sheets. If the rolls or sheets must be lifted by crane at the job site, the contractor may request the manufacturer to install lifting eyes. At all times during off loading of materials, caution must be exercised and all safety regulations and practices must be observed.

#### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Non-coated Reinforcing Bars
  - All non-coated reinforcing bars, except those to be welded, shall be of deformed type of new billet steel conforming to current requirements of ASTM A615. No rail or re-rolled steel will be permitted. Reinforcement to be welded shall conform to the requirements of ASTM A706.
  - 2. Grade or yield strength of reinforcing bars are indicated on Drawings.
- B. Welded Steel Wire Fabric (WWF)

- 1. Wire Fabric shall conform to the requirements of ASTM A185.
- 2. Required net area, placement details, and other requirements are indicated on Drawings.
- 3. Epoxy coating of Welded Wire Fabric shall be in accordance with ASTM A884.
- C. Welded Wire Reinforcement (WWR)
  - 1. Welded Wire Reinforcement shall conform to ASTM A497 and shall be made of wire conforming to ASTM A496.
  - 2. Epoxy coating of Welded Wire Reinforcement shall be in accordance with ASTM A884.
- D. Epoxy-Coated Reinforcing Bars
  - All steel reinforcing bars to be coated shall be of deformed type of new steel conforming to current requirements of ASTM A615. Bars shall be free of contaminants such as oil, grease or paint. No rail or re-rolled steel will be permitted. Reinforcement to be welded shall conform to the requirements of ASTM A706.
  - 2. Grade or yield strength of reinforcing bars is indicated on Drawings.
  - 3. Bars shall be epoxy-coated in accordance with ASTM A775.
  - 4. The coating material shall be of organic composition meeting the requirements listed in ASTM A775 Annex A1 entitled "Requirements for Organic Coating." Resistance to chemicals, applied voltage, chloride permeability, flexibility, bond strength, abrasion resistance, impact, and hardness shall be tested in accordance with Annex A1.
- E. Supports for Reinforcement
  - 1. Non-coated Reinforcement
    - Supports for reinforcement supported by formwork or deck shall consist
      of metal bolsters and chairs of adequate strength, size, and number.
       Provide CRSI Class C supports (plastic tipped) for formed concrete
      surfaces and Class A (bright basic) for metal deck.
    - Supports for reinforcement of slabs supported by ground shall consist of above supports with sand plates or horizontal runners. Support for reinforcement of footings/ pile caps shall consist of the above supports or

precast concrete block, 4" square, having a compressive strength equal to that of the concrete being placed.

#### 2. Epoxy-coated Reinforcement

- a. Epoxy-coated reinforcing bars supported from formwork shall rest on coated wire bar supports, or on bar supports made of dielectric material or other acceptable materials. Wire bar supports shall be coated with dielectric material for a minimum distance of 2" from the point of contact with the epoxy-coated reinforcing bars.
- b. Reinforcing bars used as support bars shall be epoxy-coated. In walls having epoxy-coated reinforcing bars, spreader bars, where specified on the Drawings or shop drawings, shall be epoxy-coated. Proprietary combination bar clips and spreaders used in walls with epoxy-coated reinforcing bars shall be made of corrosion-resistant material.

#### F. Tie Wire

Tie wire for fastening epoxy-coated reinforcing bars shall be nylon-epoxy, plastic-coated, or other material acceptable to the Owner.

#### 2.02 FABRICATION

#### A. General

Fabricate reinforcing bars in accordance with fabricating allowances given in ACI 315.

#### B. Epoxy-Coated Bars

1. Surface Preparation

Clean the surface of the steel reinforcing bars to be coated by abrasive blast cleaning to near-white metal in accordance with SSPC-SP10.

- 2. Application of Coating (In Shop)
  - a. Apply the coating to the cleaned surface as soon as possible after cleaning and before oxidation of the surface discernible to the unaided eye occurs. However, in no case delay application of the coating more than 8 hours after cleaning.

- b. The coating shall be applied by the Electrostatic Spray Method and fully cured in accordance with the recommendations of the manufacturer of the coating material.
- c. Coat ends of bars in accordance with the manufacturer's standards.

#### 3. Thickness of Coating Material

- a. The film thickness of the coating after curing shall be 5 to 12 mils inclusive. Take a minimum of 15 measurements approximately evenly spaced along each side of the test bar. At least 90% of these measurements shall be within the specified limits.
- b. Test the thickness of the film coating in accordance with ASTM G12.
- 4. Coating Repair: Repair coating damage due to fabrication or handling in cases where damaged area is 0.1 in<sup>2</sup> or greater. Repair all damaged areas larger than 0.1 in<sup>2</sup> with patching material. The maximum amount of damage shall not exceed 24% of the surface area of each bar. Patch in accordance with the patching material manufacturer's recommendations. Repair ends of bars cut in the field with the patching material.
- 5. Bending of Epoxy-Coated Reinforcement: Bend all epoxy-coated reinforcement cold unless otherwise approved by the Owner. When epoxy coated reinforcement bars are field or shop bent, repair coating damage in accordance with paragraph B.4 above. Rollers of bending apparatus shall have neoprene collars.

#### 2.03 SOURCE QUALITY CONTROL

A. The Owner shall have the right to inspect the material at all times while work on the Contract is being performed. Epoxy-coated reinforcing bars that do not meet the requirements of this Specification will be rejected. Replace all rejected bars at no cost to the Owner.

#### PART 3 - EXECUTION

#### 3.01 PLACEMENT

#### A. General

1. Place reinforcement in accordance with CRSI "Placing Reinforcement Bars."

- 2. Unless otherwise permitted, welding of crossing bars (tack welding) for assembly of reinforcement is prohibited.
- 3. Avoid cutting or puncturing vapor barrier during placement.

## B. Supports

- 1. Support and fasten together all reinforcement to prevent displacement by construction loads or placing of concrete.
- 2. Provide supports specified in Article 2.01.
- Provide Continuous High Chair Upper (CHCU) or Continuous Support (CS) for welded wire fabric in the metal deck and place every four feet (4') parallel to the supporting beams.
- 4. Lifting of bars, welded wire fabric, and welded wire reinforcement into position during placement of concrete is not permitted.
- 5. Where the concrete surface will be exposed to the weather in the finished structure, the portions of all accessories within 1/2" of the concrete surface shall be non-corrosive or protected against corrosion.
- 6. The following guidelines for WWR support spacing can be used for supported concrete slabs whether formed or placed on composite metal decks.

Wire Size	Wire Spacing	Support Spacing
W or D9 and larger	12" and greater	4-6 ft.
W or D5 to W or D8	12" and greater	3-4 ft.
W or D9 and larger	Less than 12"	3-4 ft.
W or D4 to W or D8	Less than 12"	2-3 ft.
Less than W or D4	Less than 12"	2-3 ft. or less.

#### C. Cover

Provide minimum protective cover given in Chapter 7 of ACI 318 if not indicated on Drawings.

#### D. Splices

1. All splices not shown on the Project Drawings shall be shown on the shop drawings and approved by the Engineer of Record.

- Welded splices Provide where indicated on Drawings. All welding shall conform to AWS D1.4. At these locations, only reinforcement conforming to ASTM A706 shall be used.
  - a. Provide suitable ventilation when welding epoxy-coated reinforcing bars.
  - b. After completion of welding on epoxy-coated reinforcing bars, repair coating damage in accordance with Article 2.02. All welds, and all steel splice members when used to splice bars, shall be coated with the same material used for repair of coating damage.

#### 3. Mechanical Connectors

- a. Provide where indicated on Drawings. Install in accordance with splice device manufacturer's recommendations.
- b. After installing mechanical connectors on epoxy-coated reinforcing bars, coating damage shall be repaired in accordance with Article 2.02. All parts of mechanical connectors used on coated bars, including steel splice sleeves, bolts, and nuts shall be coated with the same material used for repair of coating damage.

#### E. Embedment Lengths

All embedment lengths not shown on the Project Drawings shall be shown on the shop drawings and approved by the Engineer of Record.

#### 3.02 FIELD CUTTING

A. When epoxy-coated reinforcing bars are cut in the field, coat the ends of the bars with the same material used for repair of coating damage.

#### 3.03 TOLERANCES

- A. Place reinforcing bars in accordance with the tolerances given in paragraph 5.6.2 of ACI 301.
- B. Move bars as necessary to avoid interference with other reinforcement, conduits, or imbedded items. If bars are moved more than one bar diameter, or enough to exceed the above tolerances, the resulting arrangements are subject to approval by the Engineer of Record.

#### 3.04 FIELD QUALITY CONTROL

- A. Under the requirements of the Building Code, the Owner will designate an Engineer for Special Inspection to inspect the size and placement of reinforcement. A record will be made of all inspection of reinforcement at the bending bench and in place.
- B. Do not proceed with the completion of wall forms until all reinforcement has been approved and recorded by the Engineer for Special Inspection.
- C. Do not proceed with concreting until all reinforcing in place has been approved and recorded.
- D. Promptly correct all reinforcement displaced during pouring of concrete.
- E. Damaged reinforcement shall not be used.

#### 3.05 CLEANING

A. Steel reinforcement shall be free of all rust, scale, oil, paint, grease, loose mill scale, and all other foreign matter that will prevent bonding of concrete and steel just prior to pouring of concrete.

END OF SECTION 03 20 00



## PART 1 - GENERAL

# 1.01 DESCRIPTION OF WORK

- A. Furnish material, equipment, labor, services required to provide for cast-in-place concrete in accordance with the Contract Documents. The Contract Documents are as defined in the "AGREEMENT". The "GENERAL CONDITIONS" shall apply to all work under the Contract.
- B. Work includes but is not limited to structural, sitework, slabs, concrete fire protection, equipment pads, and installation of miscellaneous inserts, waterstops, vapor barriers, toppings, expansion joints and other items listed herein. Allow ample time and facility for the Work of other Divisions to be installed. Grouting is part of the Work of Section 03 61 13.

## 1.02 PRODUCTS INSTALLED BUT NOT FURNISHED UNDER THIS SECTION

Products to be installed include, but are not limited to, the following:

A.	Dovetail slots	Section 04 20 00
B.	Anchor bolts and other anchors cast into concrete	Section 05 12 00
C.	Wedge inserts and other miscellaneous items cast into concrete	. Section 05 50 00
D.	Shoes/sleeves for wrought iron fence, other items	Section 05 70 00
E.	Joint Sealers	Section 07 92 00
I.	Sleeve for pipe and conduit, other items Cast into concrete Divisi	ons 22, 23, 26 & 27
1.03	RELATED SECTIONS	
A.	Indoor Environmental Control	Section 01 57 30
B.	Construction Waste Management	Section 01 74 19
C.	Construction IAQ Management	Section 01 57 40
D.	Sidewalk and Street Paving	Section 32 13 13
E.	Concrete Formwork	Section 03 10 00
F.	Concrete Reinforcement	Section 03 20 00

#### 1.04 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

- A. American Society of Testing and Materials (ASTM) standards, latest editions.
  - C31 Standard Practice for Making and Curing Concrete Test Specimens in the Field.
  - C33 Standard Specifications for Concrete Aggregates.
  - C39 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
  - C42 Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
  - C78 Standard Test Method for Flexural Strength of Concrete (Using Simple Beam with Three-point Loading)
  - C94 Standard Specification for Ready-Mixed Concrete.
  - C127 Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Course Aggregate.
  - C131 Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angles Machine.
  - C138 Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.
  - C143 Standard Test Method for Slump of Hydraulic Cement Concrete.
  - C150 Standard Specification for Portland Cement.
  - C172 Standard Method of Sampling Freshly Mixed Concrete.

- C173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
- C192 Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
- C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- C260 Standard Specifications for Air-Entraining Admixtures for Concrete.
- C309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
- C330 Standard Specification for Lightweight Aggregates for Structural Concrete.
- C387 Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
- C494 Standard Specification for Chemical Admixture for Concrete.
- C496 Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
- C567 Standard Test Method for Density of Structural Lightweight Concrete.
- C685 Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.
- C882 Standard Test Method for Bond Strength of Epoxy-Resin Systems used with Concrete by Slant Shear
- C1315 Standard Specification for Liquid-Forming Compounds Having Special properties for Curing and Sealing Concrete
- E96 Standard Test Methods for Water Vapor Transmission of Materials
- E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth under Concrete Slabs
  - E329 Standard Specification for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction
- E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs

E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs

B.	American Concrete Institute	(ACI	) standards.	. latest editions
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ACI 117	Standard Tolerances for Concrete Construction and Materials
ACI 211.1	Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete.
ACI 211.2	Standard Practice for Selecting Proportions for Structural Lightweight Concrete.
ACI 212.3R	Chemical Admixtures for Concrete.
ACI 214	Evaluation of Results of Tests Used to Determine the Strength of Concrete.
ACI 301	Specifications for Structural Concrete for Buildings.
ACI 302.1R	Guide for Concrete Floor and Slab Construction.
ACI 304R	Guide for Measuring, Mixing, Transporting and Placing Concrete.
ACI 305R	Hot Weather Concreting.
ACI 306R	Cold Weather Concreting.
ACI 308	Standard Practice for Curing Concrete.
ACI 309R	Guide for Consolidation of Concrete.
ACI 311.4R	Guide for Concrete Inspection.
ACI 318-89	Building Code Requirements for Reinforced Concrete.

# C. American Association of State Highway and Transportation Officials

T318 Water Content of Freshly Mixed Concrete Using Microwave Oven Testing.

# 1.05 DEFINITIONS

# A. Exposed to view

Situated so that it can be seen from eye level from a public location. A public location is that which is accessible to persons not responsible for operation or maintenance of the building.

# B. Lightweight concrete

Concrete intentionally made to have low density by use of lightweight aggregate conforming to ASTM C330 and required to have an air-dry unit weight less than 115 lb/ft<sup>3</sup>.

## C. Normal weight concrete

Concrete for which density is not a controlling attribute, made with aggregates of the types covered by ASTM C33 and usually having unit weights in the range of 135 to 150 lb/ft<sup>3</sup>.

#### 1.06 DESIGN REQUIREMENTS

#### A. Performance Characteristics:

- 1. Interior slabs on grade: Normal weight concrete with a minimum compressive strength of 4500 psi, non-air entrained, and a maximum water to cement ratio of 0.40.
- 2. Foundations, foundation walls: Normal weight concrete with a minimum compressive strength of 4000 psi, air entrained, and the maximum water to cement ratio of 0.45.
- 3. Interior slabs of superstructure: Lightweight concrete with a minimum compressive strength of 4500 psi, non air-entrained, and a maximum water to cement ratio of 0.40.
- 4. Concrete parapet: Normal weight concrete with a minimum compressive strength of 4500 psi, air-entrained and a maximum water to cement ratio of 0.40.

#### 1.07 SUBMITTALS

#### A. Product Data

Submit manufacturers' information for the following:

- 1. Admixtures
- 2. Curing compounds
- 3. Hardener
- 4. Bonding Agent

- 5. Beam clips
- 6. Waterstop

## B. Samples

Submit samples of the following items

- 1. Beam clips
- 2. Waterstop

# C. Quality Control Submittals

- Design Data: Submit design mixes for concrete, including list of admixtures to be used, to the Testing Agency, the Engineer for Controlled Inspection, and the Engineer of Record. Design mix for lightweight concrete shall include both the dry and saturated (SSD) weights of the aggregate.
- 2. Test Reports: Strength Test Report (28 day) for preliminary trial mix (with all admixtures).

#### Certificates

- a. Approval for the admixtures and cement used.
- b. Admixture manufacturer's certificate stating that the chloride content of the admixture will not exceed 0.05% by weight.
- Concrete laboratory license number and certification of meeting ASTM E329 standards.
- d. Concrete producer's certificate stating the plant and trucks are DOT approved.
- e. Concrete producer's certificate must be presented at site before concrete is placed in accordance with the Building Code

## 4. Manufactures' Instructions

Waterstop manufacturer's instructions for proper installation of waterstop, including manner in which splices are to be made.

## 5. Contractor Qualifications

Provide proof of Installer and Producer qualifications specified under "Quality Assurance".

## D. Survey

Submit signed and sealed copies of surveys conducted by a Licensed Land Surveyor showing elevations of all finished slab surfaces taken on a 15-foot grid pattern. Indicate discrepancies between contract elevation and actual.

#### 1.08 QUALITY ASSURANCE

#### A. Qualifications

- 1. Concrete Installer: Company specializing in performing the Work of this Section shall have three years minimum experience on successful projects of similar size.
- 2. Concrete Producer: Company specializing in the production of concrete shall have a minimum of five years experience and shall be State DOT approved plant and use DOT approved trucks.
- 3. Concrete Laboratory: Concrete laboratory providing design mixes shall be State of Connecticut licensed and shall meet the requirements of ASTM E329.

## B. Regulatory Requirements

- 1. Building Code: Work of this Section shall conform to all requirements of the Building Code and all applicable regulations of governmental authorities having jurisdiction including safety, health, noise, and anti-pollution regulations. Where more severe requirements than those contained in the Building Code are given in this Section, the requirements of this Section shall govern.
- Industry Standards: The ACI Standards listed under references apply to Work
  of this Section. Where more severe requirements then those contained in the
  Standards are given in this Section or the Building Code, requirements of this
  Section or the Building Code shall govern. The Contractor shall keep a copy of
  ACI SP-15 "Field Reference Manual" at the site.
- 3. Recommendations or suggestions in the codes and references listed in this Article and under "References" shall be deemed to be mandatory unless they are in violation of the Building Code.

## C. Certifications

1. Cement and aggregate shall be acquired from the same source for all work.

#### D. Coordination

Coordinate this work with the work of other Divisions so that items to be installed are done so correctly and in proper sequence.

## E. Pre-Concrete Conference

- At least 30 days prior to the start of the concrete construction schedule as otherwise directed, conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete quality. The contractor shall send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.
- 2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semi-rigid joint fillers, forms and form removal limitations, shoring and re-shoring procedures, vapor-barrier installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection..

## 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Protect material from the elements and from other damage on the site.
- B. Replace and pay for material and work damaged to the satisfaction of the Owner.

## 1.10 ENVIRONMENTAL REQUIREMENTS

A. Adequately protect concrete placed during rain, sleet, or snow, or when the mean daily temperature falls below 40°F or rises above 90°F as provided in Article 3.05.

## PART 2 - PRODUCTS

#### 2.1 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
  - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
    - a. High-density overlay, Class 1 or better for architecturally exposed concrete.
    - b. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed for conditions not exposed to view.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
  - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive damp-proofing or waterproofing.

## 2.2 STEEL REINFORCEMENT

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of preconsumer recycled content is not less than 60 percent.
- B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.
- D. Galvanized Reinforcing Bars: ASTM A 615/A 615M, Grade 60.
- E. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60 epoxy coated, with less than 2 percent damaged coating in each 12-inch (300-mm) bar length.

- F. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60, deformed bars, assembled with clips.
- G. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- H. Deformed-Steel Wire: ASTM A 496/A 496M.
- I. Epoxy-Coated Wire: ASTM A 884/A 884M, Class A, Type 1 coated, as-drawn, plain steel wire, with less than 2 percent damaged coating in each 12-inch (300-mm) wire length.
- J. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
- K. Galvanized-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from galvanized-steel wire into flat sheets.

#### 2.3 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars, cut true to length with ends square and free of burrs.
- B. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.
- C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- D. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
  - 1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
  - 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
  - 3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

## 2.4 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:
  - 1. Portland Cement: ASTM C 150, Type I Supplement with the following:
    - a. Fly Ash: ASTM C 618, Class F.
    - b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- B. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: ASTM C 33, Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
  - 1. Maximum Coarse-Aggregate Size: 3/4 inch (19 mm) nominal.
  - 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- D. Lightweight Aggregate: ASTM C 330, 1/2-inch (13-mm) nominal maximum aggregate size.
- E. Water: ASTM C 94/C 94M and potable.

#### 2.5 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  - 2. Retarding Admixture: ASTM C 494/C 494M, Type B.
  - 3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  - 4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  - 5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  - 6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

# 2.6 FIBER REINFORCEMENT

A. Synthetic Macro-Fiber: Polyolefin macro-fibers engineered and designed for use in concrete, complying with ASTM C 1116/C 1116M, Type III, 1 to 2-1/4 inches (25 to 57 mm) long.

- 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Euclid Chemical Company (The), an RPM company; Tuf-Strand SF.
  - b. Grace Construction Products, W. R. Grace & Co.; Strux 90/40.
  - c. Sika Corporation; Sika Fiber MS10.

#### 2.7 WATERSTOPS

- A. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory-fabricate corners, intersections, and directional changes.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Greenstreak.
    - b. Vinylex Corp.
    - c. Earth Shield, JP Specialties, Inc.
  - 2. Profile: Ribbed with center bulb.
  - 3. Dimensions: 6 inches by 3/8 inch thick (150 mm by 10 mm thick) nontapered.
- B. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Concrete Sealants Inc.; Conseal CS-231.
    - b. Greenstreak; Swellstop.
    - c. Earth Shield, JP Specialties, Inc.

## 2.8 VAPOR BARRIERS

- A. Sheet Vapor Barrier: ASTM E 1745, Class A, Include manufacturer's recommended adhesive or pressure-sensitive tape.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Grace Construction Products, W. R. Grace & Co.; Florprufe 120.
    - b. Meadows, W. R., Inc.; Perminator 15 mil.
    - c. Stego Industries, LLC; Stego Wrap 15 mil Class A.

B. Granular Fill: Clean mixture of crushed stone or crushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.

#### 2.9 FLOOR AND SLAB TREATMENTS

- A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, non-glazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing No. 4 (4.75-mm) sieve.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Anti-Hydro International, Inc.; Emery.
    - b. Dayton Superior Corporation; Emery Tuff Non-Slip.
    - c. Lambert Corporation; EMAG-20.

## 2.10 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces SPECIFIED AS SEALED CONCRETE SURFACE PER ARCHITECTURAL DRAWINGS.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Conspec by Dayton Superior; Intraseal.
    - b. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
    - c. Meadows, W. R., Inc.; LIQUI-HARD.

# 2.11 CURING MATERIALS

- A. Evaporation Barrier: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Euclid Chemical Company (The), an RPM company; Eucobar.
    - b. Meadows, W. R., Inc.; EVAPRE.
    - c. Sika Corporation; SikaFilm.

- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Construction Chemicals Building Systems; Kure 200.
    - b. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
    - c. Meadows, W. R., Inc.; 1100-CLEAR.
- F. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, non-dissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.
  - 1. Products: Subject to compliance with requirements, provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - BASF Construction Chemicals Building Systems; Kure-N-Seal WB.
    - b. Euclid Chemical Company (The), an RPM company; Aqua Cure VOX; Clearseal WB 150.
    - c. Meadows, W. R., Inc.; Vocomp-20.
- G. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.
  - 1. Products: Subject to compliance with requirements, provide the following [provide one of the following available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. BASF Construction Chemicals Building Systems; Kure 1315.
    - b. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
    - c. Meadows, W. R., Inc.; Vocomp-30.

#### 2.12 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

- B. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:
  - 1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- D. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- E. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

#### 2.13 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.
  - 1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
  - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
  - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## 2.14 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  - 1. Fly Ash: 10 percent.
  - 2. Combined Fly Ash and Pozzolan: 10 percent.
  - 3. Silica Fume: 10 percent.
  - 4. Combined Fly Ash, Pozzolans, and Silica Fume: 15 percent with fly ash or pozzolans not exceeding 10 percent and silica fume not exceeding 5 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 percent by weight of cement.
- D. Admixtures: Use admixtures according to manufacturer's written instructions.
  - 1. Use high-range water-reducing plasticizing admixture in concrete for placement and workability.
  - 2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
  - 3. Use water-reducing admixture in pumped concrete, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.

## 2.15 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Footings and Foundation Walls: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: **4000 psi** at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
  - 3. Slump Limit: 4 inches (100 mm) and/or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch (25 mm).
  - 4. Air Content: **5** percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
- B. Slabs-on-Grade: Proportion normal-weight concrete mixture as follows:
  - 1. Minimum Compressive Strength: 4500 psi at 28 days.
  - 2. Maximum Water-Cementitious Materials Ratio: 0.40.
  - 3. Slump Limit: 4 inches (100 mm) and/or 8 inches (200 mm) for concrete with verified slump of 2 to 4 inches (50 to 100 mm) before adding high-range water-reducing admixture or plasticizing admixture plus or minus 1 inch (25 mm).

- 4. Air Content for concrete slab exposed to deicing salt: **5** percent, plus or minus 1.5 percent at point of delivery for 3/4-inch (19-mm) nominal maximum aggregate size.
- 5. Air Content for typical interior condition: Do not allow air content of trowel-finished floors to exceed 3 percent.
- 6. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 5 lb/cu. yd. (3 kg/cu. m).
- 7. Water-reducing admixture and/or high-range water-reducing plasticizing admixture.
- C. Concrete Topping SLAB ON METAL DECK: Proportion structural lightweight concrete mixture as follows:
  - 1. Minimum Compressive Strength: **4500 psi** at 28 days.
  - 2. Calculated Equilibrium Unit Weight: 115 lb/cu. ft. plus or minus 3 lb/cu. ft as determined by ASTM C 567.
  - 3. Slump Limit: 4 inches (100 mm) plus or minus 1 inch (25 mm).
  - 4. Air Content: Do not allow air content of trowel-finished floors to exceed 3 percent.
  - 5. Synthetic Macro-Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 5 lb/cu. yd. (3 kg/cu. m).
  - 6. Water-reducing admixture and/or high-range water-reducing plasticizing admixture.

#### 2.16 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

#### 2.17 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and furnish batch ticket information.
  - 1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

#### PART 3 - EXECUTION

## 3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch (3.2 mm) for smooth-formed finished surfaces of all concrete exposed to view.
  - 2. Class B, 1/4 inch (6 mm) for rough-formed finished surfaces of foundations.
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.
- G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Chamfer exterior corners and edges of permanently exposed concrete.
- I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.
- J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

## 3.2 EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures as indicated.

#### 3.3 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

## 3.4 SHORES AND RESHORES

- A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and re-shoring.
  - 1. Do not remove shoring or re-shoring until measurement of slab tolerances is complete.
- B. In multistory construction, extend shoring or re-shoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively

- loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and re-shore to avoid damage to concrete. Locate and provide adequate re-shoring to support construction without excessive stress or deflection.

#### 3.5 VAPOR BARRIERS

- A. Sheet Vapor Barriers: Place, protect, and repair sheet vapor barrier according to ASTM E 1643 and manufacturer's written instructions.
  - 1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.
- B. Bituminous Vapor Barriers: Place, protect, and repair bituminous vapor barrier according to manufacturer's written instructions.
- C. Granular Course: vapor barrier shall be placed on top of granular fill, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

#### 3.6 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
  - 1. Do not cut or puncture vapor barrier. Repair damage and reseal vapor barrier before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.
- C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.
  - 1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.
- D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.
- F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

#### 3.7 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
  - 1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
  - 2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
  - 3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
  - 4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
  - 5. Space vertical joints in walls as indicated per typical detail. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
  - 6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
  - 7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth as follows:
  - 1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  - 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
- D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

- 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
- 2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 07 Section "Joint Sealants," are indicated.
- 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

## 3.8 WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

## 3.9 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.
  - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.

- 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
  - 1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
  - 2. Maintain reinforcement in position on chairs during concrete placement.
  - 3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  - 4. Slope surfaces uniformly to drains where required.
  - 5. Begin initial floating using bull floats or darbies to form a uniform and opentextured surface plane, before excess bleed water appears on the surface. Do not further disturb slab surfaces before starting finishing operations.
- F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- G. Hot-Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

# 3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

- 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces exposed to public view.
- C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:
  - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
  - 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
  - 3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

#### 3.11 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.
  - 1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings and/or to receive mortar setting beds for bonded cementitious floor finishes.
- C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill

low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

- Apply float finish to surfaces to receive trowel finish and to be covered with fluidapplied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
- D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
  - 1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  - 2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
    - a. Specified overall values of flatness, F(F) 35; and of levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 17; for slabs-on-grade.
  - 3. Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3.2 mm).
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
  - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a broom finish to exterior concrete platforms, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.
  - Concrete walking surfaces shall achieve slip resistance; measured as the static coefficient of friction between leather [Type 1 (Vegetable Tanned) of Federal Specification KK-L-165C] and floor surface greater than 0.6 per Laboratory test procedure ASTM D 2047.

#### 3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as

- specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

## 3.13 CONCRETE PROTECTING AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.
- B. Evaporation Barrier: Apply evaporation barrier to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.
- D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

- 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
  - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
  - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
  - c. Cure concrete surfaces to receive floor coverings with either a moistureretaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.
- Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.
  - a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.
- 4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

## 3.14 LIQUID FLOOR TREATMENTS

- A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
  - 1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
  - 2. Do not apply to concrete that is less than seven days' old.
  - Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

## 3.15 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

- 1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

## 3.16 CONCRETE SURFACE REPAIRS

- A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
  - 1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  - 2. After concrete has cured at least 14 days, correct high areas by grinding.

- 3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
- 4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
- 5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
- 6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- 7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

### 3.17 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
  - 1. Steel reinforcement placement.
  - 2. Steel reinforcement welding.
  - 3. Headed bolts and studs.
  - 4. Verification of use of required design mixture.
  - 5. Concrete placement, including conveying and depositing.
  - 6. Curing procedures and maintenance of curing temperature.
  - 7. Verification of concrete strength before removal of shores and forms from beams and slabs.

- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Testing Frequency: Obtain at least one composite sample for each 50 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressivestrength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  - 2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; ASTM C 173/C 173M, volumetric method, for structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
  - 5. Unit Weight: ASTM C 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  - 6. Compression Test Specimens: ASTM C 31/C 31M.
    - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
  - 7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
    - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  - 8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
  - 9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

- 10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- 11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- 12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
- 13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- D. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.

#### 3.18 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 03 30 00



#### PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.

# 1.2 DESCRIPTION

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.3 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the cement leveling compound as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Self-leveling cement compound applied over existing concrete substrates; thickness shall be 1/4" minimum.

#### 1.4 RELATED SECTIONS

A. Cast-in-Place Concrete - Section 033000.

#### 1.5 QUALITY ASSURANCE

A. Applicator: Company specializing in performing the work of this Section with a minimum of 3 years' experience and approved by the manufacturer of the product used.

### 1.6 SUBMITTALS

- A. Submit catalog information and product data for material to be used.
- B. Submit approval letter as required by Article 3.1, para. B. herein.

## 1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

## 1.8 MOCK-UP

- A. Construct a mock-up of underlayment material, 8 feet long by 8 feet wide.
- B. Locate where directed by the Architect.
- C. Approved mock-up may remain as part of the Work.

#### 1.9 JOB REQUIREMENTS

- A. Do not install underlayment until floor penetrations and peripheral work are complete.
- B. Maintain minimum ambient temperatures of 50 degrees F. 24 hours before, during, and 72 hours after installation of underlayment.
- C. During the curing process, ventilate spaces to remove excess moisture and until underlayment is dry, allow a minimum of seven (7) days.

# PART 2 PRODUCTS

## 2.1 MANUFACTURER

- A. Subject to the requirements specified herein, provide one of the following products:
  - 1. "Supercap SC500" by Laticrete.

- 2. "Level Set 200" by ProSpec.
- 3. "DSP-520" made by H.B. Fuller Co.
- 4. "Super Flo-Top" made by Euclid Chemical Co.
- 5. "K-15" made by Ardex.
- 6. "Ultraplan 1 Plus" by the Mapei Corp. (rapid setting).
- 7. "Novoplan 2" by the Mapei Corp. (standard setting).
- 8. "Level Quick R/S" or "E/S" by Custom Builing Products.

## 2.2 MATERIALS

- A. Underlayment: One of the above listed products.
- B. Water: Potable and not detrimental to underlayment mix materials.
- C. Primer: Manufacturer's recommended type.
- D. Joint and Crack Filler: Latex based.

#### 2.3 MIXING

- A. Site mix materials in accordance with manufacturer's instructions.
- B. Mix to achieve following characteristics:
  - 1. Density: 115 lb./cu. ft. minimum dry density.
  - 2. Compressive Strength: 4,000 psi minimum in accordance with ASTM C 109.
  - 3. Fire Hazard Classification: Flame/Smoke rating of 0/0 in accordance with ASTM E 286.
- C. Mix to self-leveling consistency.

#### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where cement leveling compounds are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work. B. Manufacturer's representative must inspect surfaces to receive cement leveling compound and approve those surfaces in writing to the Architect prior to start of application.

# 3.2 PREPARATION

- A. Vacuum clean surfaces; remove any material (curing compounds, film, dirt) that would be detrimental to bond of cement leveling compound.
- B. Prime substrate in accordance with manufacturer's instructions. Allow to dry.
- C. Close floor openings.

## 3.3 APPLICATION

- A. Install underlayment in accordance with manufacturer's instructions.
- B. Place to minimum 1/4" thickness.
- C. Transition to existing floor; use stiff mix to slope to align with existing adjacent floor.

#### 3.4 CURING

A. Air cure in accordance with manufacturer's instructions.

# 3.5 APPLICATION TOLERANCE

A. Top Surface: Level to 1/8 inch in 10 feet, or as indicated in Section 033000 "Cast-in-Place Concrete."

# 3.6 PROTECTION OF FINISHED WORK

A. Do not permit traffic over unprotected floor underlayment surfaces and until underlayment is completely dry.

**END OF SECTION** 

#### **SECTION 03 61 13**

## **GROUTING**

# PART 1 - GENERAL

# 1.01 DESCRIPTION OF WORK

- A. Furnish material, equipment, labor, services required to provide non-shrink grout in accordance with the Contract Documents. The Contract Documents are as defined in the "AGREEMENT". The "GENERAL CONDITIONS" shall apply to all work under the Contract.
- B. Work includes, but is not limited to grouting under steel and mechanical equipment base plates, filling of fence and rail posts sleeves, grouting of piping, and wherever else shown on Drawings.

# 1.02 RELATED SECTIONS

A.	Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings	Section 01 57 30
B.	Construction Waste Management	Section 01 74 19
C.	Construction IAQ Management	Section 01 57 40
D.	Structural Steel	Section 05 12 00
E.	Miscellaneous Metals	Section 05 50 00
F.	Ornamental Metal	Section 05 70 00
G.	General Requirements	Division 1

#### 1.03 REFERENCES

References and industry standards listed in this Section are applicable to the Work. Unless more restrictive criteria or differing requirements are explicitly stated in the Specifications, or mandated by governing codes or regulations, the recommendations, suggestions, and requirements described in the referenced standards shall be deemed mandatory and applicable to the Work.

A. American Society of Testing and Materials (ASTM) Standards, latest editions.

ASTM C109 Test Method for Compressive Strength of Hydraulic Cement

Mortars.

ASTM C827 Test Method for Early Volume Change of Cementitious Mortars.

ASTM C1107 Specification for Packaged Dry, Hydraulic-Cement Grout

(Non-shrink).

# B. Army Corp of Engineers

CRD C-621 Specification for Non-Shrink Grout.

# 1.04 SUBMITTALS

## A. Product Data

Submit manufacturer's information on the non-shrink grout, including mixing and installation instructions for each type of application.

# B. Quality Control Submittals

Contractor Qualifications

Provide proof of Contractor qualifications specified under "Quality Assurance".

## 1.05 QUALITY ASSURANCE

# A. Qualifications

- 1. Manufacturer: Company specializing in the production of grout shall have a minimum of five years experience.
- 2. Installer: Company specializing in performing the work of this section shall have three years minimum experience.

# 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Materials shall be delivered in manufacturer's sealed and undamaged packaging. Each package shall contain clear and legible labels that meet requirements of local, state and federal regulations identifying manufacturer's name, product name, quantity of material, and batch number.
- B. Protect material from the elements and from other damage at site.
- C. Replace and pay for material and work damaged to the satisfaction of the Owner.

## 1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not apply grout at temperatures below 40°F. Follow manufacturer's recommendations for placement temperatures, which is typically at an optimum range of 50°F to 80°F. Provide hot and cold weather procedures at other temperatures.

## PART 2 - PRODUCTS

## 2.01 MANUFACTURERS

## A. Grout

- Sika Corp., Lyndhurst, NJ 07071
- 2. Euclid Chemical Company, Cleveland, OH 44110
- 3. Five Star Products, Inc., Fairfield, CT 06824

#### 2.02 MATERIALS

# A. Grout

- Grout shall be non-shrink, non-metallic, cement based material meeting ASTM 1107 and CRD C-621 with the following characteristics:
  - a. Minimum compressive strength of 6000 psi @ 28 days when testing in accordance with ASTM C109 or CRD C-621.
  - Slight positive expansion when tested in accordance with CRD C-621 or ASTM C827.

#### Products:

- a. SikaGrout 212 by Sika Corp.
- b. Dry Pack Grout and NS Grout by Euclid Chemical Company
- c. "Five Star Grout" by U.S. Grout Corp.

# PART 3 - EXECUTION

# 3.01 EXAMINATION

- A. Examine all adjoining work on which this Work is in anyway dependent for proper installation and workmanship. Report to the Owner any condition that prevents the performance of this Work.
- B. Repair surfaces to receive grout as approved by the Engineer of Record to ensure that the maximum allowed thickness of material is not exceeded.

## 3.02 SURFACE PREPARATION

- Concrete surface shall be free of all loose material.
- B. Steel shall be clean and free of corrosion.
- C. Surfaces shall be free of oil, grease, loose paint, corrosive deposits, dust, laitance and other contaminants.
- D. Sleeves and holes shall be clean of water, dust and debris.

# 3.03 APPLICATION

- A. Perform all grouting in accordance with the recommendations of ACI, CSI, and the grout manufacturer's published specifications for site preparation, product mixing, and placing. For grouting in weather below 50°F, contact manufacturer for cold weather instructions.
- B. Arrange with the manufacturer of the grout for the services of a qualified field representative to instruct the work crews in the mixing of components, preparation of surfaces, technique of installation, and inspection procedures.
- C. Place grout at a no more than "flowable" consistency, carefully using the manufacturer's recommended water content.

## D. Locations

- Provide grout 1" thick minimum, 2" thick maximum, unless otherwise specified, under column base plates and beam bearing plates. Work grout under plates to provide full and even bearing. Grouting is to be done prior to placement of any concrete on the structure.
- 2. Provide grout for grouting fence posts into sleeves. Grout is to be placed at a "plastic" consistency and crowned at the post to shed water away from the post onto the adjoining concrete surface.
- 3. Provide grout for grouting bars in concrete and for "Dry Packing". Follow manufacturer's procedure for mixing and installation.

- 4. Provide grout under equipment bases.
- 5. Provide for grouting in pipes entering precast units.
- 6. Provide grout wherever else it is indicated on Drawings or Specifications.
- E. Follow manufacturer's instructions for curing.

## 3.04 PROTECTION AND CLEANING

A. Clean all adjacent area of excess material and clean all floors and walls of powder and droppings.

# 3.05 FIELD QUALITY CONTROL

- A. The Owner's Testing Laboratory will inspect the grouting procedure and take cube specimens to test compressive strength.
- B. The Owner will inspect and reject any that are of inadequate strength or contains cracks or other defects. These areas shall be fixed at contractor's expense.
- C. Engage the services of the material manufacturer's representative to instruct in the proper mixing and usage of the material to ensure the grout is placed at the correct consistency and manner.

END OF SECTION 03 61 13



## PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the unit masonry work as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Concrete block walls and partitions.
  - 2. Face brick.
  - 3. Metal joint reinforcing, anchors, ties, weeps, closures and related accessories for masonry.

- 4. Control and expansion joints in masonry, filled with joint fillers.
- 5. Through-wall flashing.
- 6. Cavity drainage material.
- 7. Chases, recesses, pockets and openings in masonry as required for installation of work by others.
- 8. Building in of items furnished by others into masonry, including access doors, door frames, anchors, sleeves and inserts, and other similar items to be embedded in masonry.
- 9. Grouting in of metal items built into masonry work.
- 10. Protection, pointing and cleaning of masonry.

## 1.3 RELATED SECTIONS

- A. Cast-in-Place Concrete Section 033000.
- B. Cast Stone Section 047200.
- C. Cold-Formed Metal Framing Section 054000.
- D. Steel lintels Section 055000.
- E. Thermal Insulation Section 072100.
- F. Sheet Metal Flashing Section 076200.
- G. Firestops and Smokeseals Section 078413.
- H. Joint Sealers Section 079200.
- I. Glazed Aluminum Curtain Walls Section 084413.

# 1.4 SUBMITTALS

- A. Submit Shop Drawings for the following:
  - 1. Anchoring details.
  - 2. Control and expansion joint locations and details.
  - 3. Special brick shapes.
  - 4. Flashing at typical lintels indicating relationship of flashing to lintel hangers.
- B. Submit Samples for the following:

- Each type of face brick in sufficient number and color (not less than 5) to show full range of color, texture and shade. Submit certification that brick meets ASTM standards specified herein.
  - a. Submit samples of all special shapes required showing color range and sizes.
- 2. Each type of decorative concrete block.
- 3. Joint reinforcing, each type, width and proposed location (labeled).
- 4. Anchors, wedges and ties, each type, width and proposed location (labeled).
- 5. Joint filler, each type.
- 6. Flashing, including splice sample, 12" long.
- 7. Mortar color, 12" long cured sample.
- C. Submit technical and installation information for the following:
  - 1. Mortar materials, each material and mortar type.
  - 2. Certification of mortar mix.
  - 3. Flashing material, descriptive literature.
  - 4. Concrete block, joint reinforcing, anchors, ties and joint filler; submit manufacturer's technical and descriptive literature.
  - Block manufacturer shall submit certifications of compliance with ASTM C 90, C 331 and UL 618 prior to any job site delivery. Field sampling of concrete block may be tested by an Independent Testing Laboratory retained by the Owner according to the requirements of ASTM C 140.
- D. Cleaning Procedures: Submit proposed procedures and materials for cleaning masonry work; including certification that cleaner will not adversely affect stone, gaskets, sealants, etc.

# 1.5 QUALITY ASSURANCE

- A. Conform to the following non-cumulative tolerances (any masonry work not meeting these standards shall be re-built as directed by the Architect).
  - 1. Variation from the plumb:
    - a. In lines and surfaces of columns, walls and arrises:
      - In 10 feet
         In any story of 25 feet maximum
      - 3). In 40 feet or more 1/4"
    - b. For external corners, expansion joints and other conspicuous lines:
      - 1). In any story of 25 feet maximum 1/4"

2). In 40 feet or more

3/8"

2. Variation from the level or the grades indicated on the drawings; for exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines:

a. In any bay or 20 feet maximum

1/4"

b. In 40 feet or more

1/4"

3. Variation of the linear building lines from established position in plan related portion of columns and partitions:

a. In any bay or 20 feet maximum

1/4"

b. In 40 feet or more

1/2"

4. Variation in cross-sectional dimensions of columns and in thickness of walls:

a. Minus

1/8"

b. Plus

1/8"

5. Variation in dimensions of masonry openings:

a. Horizontal dimension

-0" + 1/16"

b. Vertical dimension

+0" - 1/16"

- B. Job Mock-Up: Prior to installation of masonry work, erect sample wall panel mock-up using materials, bonding patterns and joint tooling required for final work and including cavity wall, masonry sill, window unit and sill, projecting courses, anchors and reinforcement as detailed. Provide special features as directed by the Architect for caulking and contiguous work. Build mock-up at the site, 4' x 4' size as directed by the Architect, indicating the proposed range of colors, textures and workmanship to be expected in the completed work. Reconstruct mock-up if directed by the Architect until it meets with Architect's approval. Obtain Architect's acceptance of visual qualities of the mock-up before start of masonry work. Retain mock-up during construction as a standard for judging completed masonry work. Do not alter, move or destroy mock-up until work is completed and accepted by the Architect. Use sample panels to test proposed cleaning procedures after sample panel meets with Architect's approval.
  - 1. Approved sample panel shall remain on view at the site until completion of face brick work and shall establish the technical and aesthetic standards for the Project.
  - 2. Architect shall direct distribution of brick color and texture variation within mock-up.
  - 3. Provide a separate mock-up for each project (Student Center and Theater).
- C. Factory Control
  - 1. The Architect reserves the right to visit the brick manufacturer's facility and review presorting so that all brick falls within a color range acceptable to the Architect.

- 2. 4' x 4' mock-ups shall be constructed at the factory using the face brick specified. This mock-up, after approval of the Architect, shall become the quality control panel for the selected brick.
- 3. Prior to any shipment of the face brick from the factory, the Architect reserves the right to inspect the brick for the thoroughness of the pre-sorting and to reject any brick which in his opinion do not fall within acceptable color range.
- D. Work of this Section shall conform to the requirements of the following:
  - 1. 2011 "Building Code Requirements for Masonry Structures," (TMS 402-11/ACI 530-11/ASCE 5-11).
  - 2. 2011 "Specification for Masonry Structures," (TMS 602-11/ACI 530.1-11/ASCE 6-11).
  - 3. Brick Industry Association (BIA) "Technical Notes on Brick Construction."
- E. Pre-Construction Conference: Prior to installation of masonry and associated work, Contractor shall arrange a meeting with Masonry Subcontractor, installers of related work, and other entities concerned with masonry wall performance, including the Architect and Owner. Contractor shall record discussions and agreements and furnish copy to each participant. Provide at least seventy-two (72) hours' advance notice to participants prior to convening conference. Review methods and procedures related to masonry work, including, but not limited to, the following:
  - 1. Review masonry requirements (drawings, specifications and other Contract Documents).
  - 2. Review required submittals, both completed and yet to be completed.
  - Review and finalize construction schedule related to masonry work and verify availability of materials, installer's personnel, equipment and facilities needed to make progress and avoid delays.
  - 4. Review required inspection, testing, certifying and material usage accounting procedures.
  - Review weather and forecasted weather conditions, and procedures for coping with unfavorable conditions.
  - 6. Coordinate work with air/vapor barrier membrane and related flashing, review details to avoid conflicts.
- F. Testing for Efflorescence: Test selected face brick for efflorescence in accordance with ASTM C 67. If, at the end of the test period, the samples of brick or mortar show efflorescence, the materials represented shall be rejected and new materials shall be re-tested. This process shall be repeated until no efflorescence appears. Testing shall be done by an independent testing laboratory at the expense of the Contractor; submit test results in writing to the Architect.

## 1.6 PRODUCT HANDLING

- A. General: Deliver, store, handle and protect all materials from damage, moisture, dirt and intrusion of foreign matter. Store all masonry units and mortar materials on raised platforms and under ventilated and waterproof cover. Store packaged materials in manufacturer's unopened containers, marked with manufacturer's name and product brand name. Immediately reseal containers after partial use. Remove and replace damaged materials.
- B. Masonry Units: Pack, deliver and store to prevent breakage, cracking, chipping, spalling or other damage. Store, protect and ventilate units at project site.
- C. Aggregate: Store with provisions for good drainage.
- D. Reinforcement and Anchors: Store and protect so that when placed, joint reinforcement and anchors will be free of soil, dirt, ice, loose rust, scale, or other coatings which would destroy or reduce bond with mortar, and will not be disfigured or bent out of shape.

## 1.7 JOB CONDITIONS

- A. In cold weather, when the outside temperature is below forty (40) deg. F., conform to the requirements of "Cold Weather Masonry Construction and Protection Recommendations" publication by Brick Industry Association (BIA). No anti-freeze admixtures are permitted.
  - 1. In addition, conform to the following:
    - Masonry materials must be warmed as required.
    - b. Brickwork must be protected a minimum of 24 hours after installation so as to maintain enough heat for hydration of the cement in the mortar.
- B. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg. F. and above. In addition, conform to the following:
  - 1. Masonry materials must be cool.
  - 2. Mortar must be used within 2 hours of initial mixing.
- C. Protection of Masonry: During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24" down both sides and hold cover securely in place.
  - Where one wythe of multi-wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24" down face next to unconstructed wythe and hold cover in place.

- D. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
  - 1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on ground and over wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
  - 4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt on completed masonry.

## 1.8 ATTIC STOCK

- A. Provide additional 10% of dry mortar mix labeled, packaged and delivered to location determined by Owner for attic stock.
- B. Provide additional 5% of brick labeled, packaged and delivered to location determined by Owner for attic stock.

## PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Standard Concrete Block
  - 1. Portland cement, ASTM C 150, Type 1, low alkali (less than 0.6%), single source for entire project.
  - 2. Aggregates, ASTM C 331, lightweight expanded shale, clay or slate aggregates, manufactured by the rotary kiln process "Solite," "Norlite," or "Haydite."
    - a. Block scheduled to receive painted finish shall contain normal weight aggregate meeting ASTM C 33 in addition to lightweight aggregate in order to receive a smooth, uniform finish.
  - 3. Concrete Masonry Units: Load bearing lightweight aggregate concrete masonry units conforming to the requirements of ASTM C 90, Type 1.
    - a. Block behind face brick and block for rated walls shall be 75% solid units.
    - b. All other block may be hollow units.
  - 4. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3000 psi.

- 5. The producer of the concrete masonry units shall furnish certification from an independent testing laboratory confirming that all 8" or larger masonry units meet all of the UL 618 requirements for two (2) hours or better (as required), referencing full scale fire test reports (ASTM E 119). All 4" and 6" units shall conform to "National Bureau of Standards" and "National Research Council" full scale fire tests.
- 6. Sizes and Shapes: Nominal face size 8" x 16" by thickness as indicated on drawings, with stretcher units, jamb units, header units, square corner units (at ends and corners of exposed or painted work), sash units (at control joints within masonry wall), lintel units and other special shapes and sizes required to complete the work.
- 7. Finish: For exposed or painted block surfaces, in addition to ASTM requirements, block shall have uniformly dense, flat, fine grain texture, with no cracks, chips, spalls, or other defects which would impair appearance. For concealed CMU, surfaces shall be free from deleterious materials that would stain plaster or corrode metal.
- 8. Curing: All concrete block shall be steam cured, and air dried for not less than thirty (30) days before delivery.
- 9. Density of concrete block shall not exceed one hundred and five (105) lbs. per cubic foot.
- Shrinkage: Shrinkage of concrete blocks shall not exceed 0.065% when tested in accordance with ASTM C 426-99.

#### 11. Water Content

- a. At the time of delivery to the job site, concrete masonry units shall have a value, in weight of contained water, of not more than thirty (30) percent of the fully saturated content for the unit tested.
- b. Ship all units from the factory, and store at the job site, with all necessary protection to prevent increase of water content from rain and other sources.
- 12. Integral Water Repellent: Provide units made with integral water repellent, as follows:
  - a. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514 as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.

# B. Brick

- 1. Facing Brick: ASTM C 216, Grade SW, Type FBX. Individual units shall not vary by more than 5 percent.
  - a. Size: Unless otherwise indicated, provide 3-5/8" deep x 2-1/4" high x 7-5/8" long modular bricks.

- b. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 5000 psi, minimum.
- c. Initial Rate of Absorption: Less than 25 grams per 30 sq. in. of surface area per minute when tested according to ASTM C 67.
- d. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
- 2. Where brick is fully concealed provide common brick conforming to ASTM C 62, Grade SW.
- 3. Provide all special molded shapes, including lipped brick, as indicated on the drawings.
- 4. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncored units with all exposed surfaces finished.
- 5. Student Center Brick:
  - a. Glen-Gery Brick/Mid Atlantic Plant: Molded Series 53-DD Modular (Basis of Design)
  - b. Redland Brick/Cushwa Plant: 237 Cambridge Modular
  - c. Petersen Tegl: Size to match basis of design in color range and shape.
- 6. Theater Brick:
  - a. McAvoy Brick, Phoenixville, PA: Full Range Commerce Red Modular (Basis of Design)
  - b. Glen-Gery Brick/Capitol Plant: Richmond Modular
  - c. Petersen Tegl: Size to match basis of design in color range and shape.
- C. Joint Reinforcing for Masonry Walls
  - 1. For anchoring face brick to CMU back-up, provide No. 280 "S.I.S. Dub'l Loop-Lock Ladder Seismiclip Interlock System" made by Hohmann & Barnard or other manufacturer noted below in Para. C.5. All wire used in assembly shall be 3/16" dia. Assembly shall contain ladder reinforcing, welded loops, box tie, seismiclip and continuous wire in face brick mortar joint. Provide special formed prefabricated pieces at corners and intersections of walls or partitions. Reinforcing wire in face brick mortar joint to extend at least 2" into face of brick. Show anchor locations on approved shop drawings.
    - Reinforcing assembly shall be hot dip galvanized steel finish conforming to ASTM A
       153 with zinc coating of 1.5 oz. of zinc per sq. ft, after fabrication.
  - For block walls forming part of exterior wall construction behind exterior stone veneer, provide super heavy duty reinforcing fabricated of 3/16" dia. side and cross rods, truss or ladder design, ties, spaced every block course. Provide prefabricated pieces at corners and intersections of walls or partitions.

- Reinforcing assembly shall be hot dip galvanized steel finish conforming to ASTM A
   153 with zinc coating of 1.5 oz. of zinc per sq. ft., after fabrication.
- 3. For interior block walls and partitions, provide standard reinforcing fabricated of 9 ga. side and cross rods, truss or ladder design, no ties, spaced every other block course. Provide prefabricated pieces at corners and intersections of walls or partitions. Reinforcing shall be mill galvanized conforming to ASTM A 641, Class B-1, applied after fabrication.
- 4. Wire used in assemblies noted above shall be cold drawn steel wire conforming to ASTM A 82.
- 5. Approved Joint Reinforcing Manufacturers
  - a. Products listed and shown on drawings are those of the basis of design, Hohmann & Barnard unless otherwise noted; subject to compliance with requirements specified, other manufacturers include Wire-Bond, Heckmann Building Products and National Wire Industries, Inc.

#### D. Anchors and Ties

- 1. For anchoring brick to cold-formed metal framing, provide the following or by other manufacturers noted above in Para. C.5:
  - a. "X-Seal Anchor" with standard diameter "Vee-Byna Tie" and continuous joint reinforcing wire, all in Type 304 stainless steel with "X-Seal Tape", as manufactured by Hohmann and Barnard.
- 2. Dovetail Anchor Slots: Hot-dip galvanized steel, 16 gauge, No. 100 Dovetail Anchor Slot made by Heckmann Building Products, No. 305 anchor slot made by Hohmann & Barnard, by other manufacturers in Para. C.5.
- 3. Flexible Metal Ties for Dovetail Slots: Hot-dip galvanized, 16 gauge by 1" wide by Heckmann Building Products Inc., manufacturer noted above in Para. C.5.
  - a. No. 106 Dovetail Corrugated Anchor.
  - b. No. 129 Dovetail Triangle Tie.
- 4. Wire Mesh: Hot-dip galvanized sixteen (16) gauge steel wire, square mesh, width 3" by length to suit condition; No. 268 by Heckmann Building Products, by manufacturer noted above in Para. C.5.
- 5. For anchoring face brick to concrete back-up where there are no dovetail slots provided, provide "Thermal 2-Seal Tie" with "2 Seal Byna-Lok Wire Tie" and continuous joint reinforcing wire, all in Type 304 stainless steel, as manufactured by Hohmann and Barnard, or manufacturer noted above in Para. C.5.
- 6. For anchoring CMU wall, at the exterior masonry cavity wall, to the underside of the concrete beam, provide dovetail slot as noted above and the following:

- No. 121 galvanized steel dowel anchor and No. 421 tube as manufactured by Heckmann Building Products or manufacturer noted above in Para. C.5. Galvanized to conform to ASTM A 153, Class B-2.
- No. PTA-310 galvanized steel dowel anchor and No. NS-TA joint filler as manufactured by Hohmann & Barnard or manufacturer noted above in Para. C.5. Galvanizing to conform to ASTM A 153, Class B-2.
- 7. For anchoring masonry to structural steel, provide hot-dip galvanized steel, as listed, or manufacturer noted above in Para. C.5:
  - a. Made by Heckmann Building Products. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.
    - 1). No. 195 Column Anchors
    - 2). No. 197 Column Anchors
    - 3). No. 315 Weld-On Anchor Rods with No. 316 Triangle Ties
    - 4). No. 315-B Weld-On Anchor Straps with No. 316 Triangle Ties
  - b. Made by Hohmann & Barnard or manufacturer listed above. Galvanizing shall conform to ASTM A 153, with zinc coating of 1.5 oz. of zinc per sq. ft.
    - 1). No. 355 Column Anchors
    - 2). No. 356 Column Anchors
    - 3). No. 357 Beam Anchors
    - 4). No. 359 F anchor straps with VWT tie.
- 8. For anchoring CMU interior partitions to underside of steel beams, provide hot dip galvanized steel tube anchors No. 419 and No. 421 made by Heckmann Building Products, No. PTA-420 made by Hohmann & Barnard, or by manufacturer noted above in Para. C.5.
- 9. For anchoring CMU interior partitions to underside of structural deck, provide 4" x 4" x 1/4" galvanized steel angles (ASTM A 36), 3'-0" long spaced 3'-0" o.c. alternately on each side of partition. Anchor partition securely to structural deck.
- E. Reinforcing Bars and Rods: ASTM A 615, Grade 60. See Drawings for size.
- F. Control and Expansion Joint Fillers
  - Vertical Installation Within Concrete Masonry Wall: Extruded high grade neoprene rubber, cross shape, for use with concrete masonry sash units, which shall provide a force fit in the grooves of the sash block, and shall have 1/2" diameter tubular ends (compressed 25% when installed in 3/8" wide joint).
    - a. Provide the following sizes:
      - 1). 2-5/8" wide control joint fillers for 4" block walls.
      - 2). 4-5/8" wide for 6" block walls.
      - 3). 6-5/8" wide for 8", 10" and 12" block walls.
    - b. Provide backer rod and sealant joint over joint filler as per drawings and Section 079200 of these specifications.

- 2. Isolation Joint Filler at Abutting Construction and at Intersecting CMU Walls: Compressible and resilient closed cell neoprene gasket with pressure sensitive adhesive backing, thickness 30% greater than thickness of joint. Acceptable joint filler shall be "Everlastic, Type NN-1" by Williams Products, Inc. or by manufacturer listed above Recess joint filler and install backer rod and sealant as per drawings and Section 079200 of these specifications.
- 3. Within Face Brick: Provide filler rod and sealant installed by Section 079200. Filler depth shall be 2 times joint width.
  - a. Compressible filler between top of brick and bottom of shelf angle shall be "Soft Joint Sealant" made by Polytite or by manufacturer listed above.
- Within Expansion Joint at Face Brick: Manufacturer's standard preformed, precompressed, open-cell polyurethane foam sealant impregnated with a water based, nondrying polymer modified acrylic water repellent. Provide "Seismic Colorseal" installed to twenty-five 25 percent compression, as manufactured by Emseal or by manufacturer listed above.
  - a. Properties: Permanently elastic, mildew resistant, non-migratory, non-staining, and compatible with joint substrates and other joint sealants. Density: 8.4 to 9.1 lb./cu. ft.
- G. Drainage Mat in Masonry Cavity: "Hydroduct 220" as manufactured by Grace Construction Products or "CCW Miradrain 6000" by Carlisle or "TREMDrain" by Tremco. Mechanically affix using brick anchor system.

# 2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type 1, standard color, one source.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Aggregate for Mortar: Clean, washed, buff colored sand, graded per ASTM C 144.
- D. Aggregate for Grout: ASTM C 404.
- E. Water: Clean, fresh and suitable for drinking.

# 2.3 MORTAR MIX

- A. Exterior Face Brick Construction: Mortar mixes shall meet ASTM C 270, Type S, cement/lime mortar. Colors of mortars shall use coloring agent made by Davis Colors, Lehigh Cement, Solomon Colors. Color of mortar to meet with Architect's approval. The Contractor may use pre-packaged colored mortar "Color Mortar Blend" made by Glen-Gery, "Spec-Mix" or Solomon Mortar Colors.
  - 1. Color of mortar must meet with Architect's approved sample and mock-up panel.

- Exterior Block Back-Up Construction: Provide Portland cement/lime mortar as noted above conforming to ASTM C 270, Type N.
- C. Interior Masonry Construction: Provide Portland cement/lime mortar conforming to ASTM C 270, Type N, for load bearing conditions, mortar shall conform to ASTM C 270, Type M.
- Reinforced Concrete Block: Provide Portland cement/lime mortar conforming to ASTM C 270,
   Type S.
- E. Mortar for Cement Cants: One (1) part Portland cement and four (4) parts sand, by volume.
- F. Grout for Unit Masonry: Comply with ASTM C 476 for grout for use in construction of unit masonry. Use grout of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout. Grout shall have a minimum compressive strength of 3500 psi when tested in accordance with ASTM C 1019.

# G. Mixing

- 1. General: Add cement just before mixing and mix dry. Use sufficient amount of water as necessary to produce workable mix. Mix in small batches to make plastic mass.
- 2. Mixing: Machine mix all mortars in approved type mixer with device to accurately and uniformly control water. Add hydrated lime dry. Mix dry materials not less than two (2) minutes. Add water, then mix not less than three (3) minutes, not to exceed five (5) minutes. Mix only amount of mortar that can be used before initial set. Do not use mortar which has reached its initial set or two (2) hours after initial mixing, whichever comes earlier. Mortar may not be re-tempered. Clean mixer for each batch, whenever mortar type is changed, and at end of each day's work.
- 3. Acceleration or other admixtures not permitted.
- 4. Mortar shall have a flow after suction of not less than seventy-five (75) percent of that immediately after mixing as determined by ASTM C 91.

#### H. Admixtures

- 1. No air-entraining admixtures or cementitious materials containing air-entraining admixtures shall be used in the mortar.
- 2. No antifreeze compounds or other substances shall be used in the mortar to lower the freezing point.
- Calcium chloride or admixtures containing calcium chloride shall not be used in mortar.

#### 2.4 MASONRY ACCESSORIES

A. Neoprene Joint Filler: Provide closed cell neoprene, Type NN-1, conforming to ASTM D 1056, Grade 1, high performance, as manufactured by Williams Products Inc., D. S. Brown, Norton,.

- B. Plastic Cell Weep Holes: See 044200 for manufacturers.
- C. Through-Wall Flashing: Provide "Copper-Fabric SA Self Adhering Copper Fabric Flashing" as manufactured by Hohmann and Barnard, consisting of 7 oz. copper shhet with a polyethelyne film. Provide sealants and primers as reccomended by manufacturer. Provide preformed corner sections "end dams" with system when flashing is discontinuous.
  - Provide flashing for surface adhered applications at sheathed areas with 26 ga. stainless steel termination bar.
  - 2. Wall flashing shall have 26 ga. stainless steel drip edge adhered to edge of flashing, drip edge shall be set in sealant as specified in Section 079200.
- D. Cavity Drainage Material: Provide 10" high HDPE "Mortar Net" open mesh mortar net of width to fit masonry cavity shown on drawings, manufactured by Mortar Net USA, Ltd., "Mortar Maze," made by Advanced Building Products, or "Mortar Web" by Hohmann and Barnard.

#### PART 3 EXECUTION

#### 3.1 SURFACE CONDITIONS

## A. Inspection

- Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
- 2. Verify that masonry may be completed in accordance with all pertinent codes and regulations, the referenced standards, and the original design.
- 3. Do not start any work until mock-ups are approved by the Architect.

#### B. Discrepancies

- 1. In the event of discrepancy, immediately notify the Architect in writing.
- 2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.
- 3. Starting of work by the Contractor means acceptance by the Contractor of the substrate.

# 3.2 COORDINATION

A. Carefully coordinate with all other trades to ensure proper and adequate interface of the work of other trades with the work of this Section.

#### 3.3 PREPARATION

A. Brick

- 1. Wet brick having an initial rate of absorption greater than 30 grams per 30 square inches when tested per ASTM C 67. Wet bricks by allowing water to run on the cubes or pallets of brick, or placing them in a large tank of water.
- 2. Except for absorbent units specified to be wetted, lay masonry units dry.
- B. Concrete Block: Do not wet concrete block units.

## 3.4 INSTALLATION

# A. General

- 1. Build walls to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness shown.
- 2. Build chases and recesses as shown or required for the work of other trades.
- 3. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- 4. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to properly locate openings, movement type joints, returns and off-sets. Avoid the use of less than half size units at corners, jambs and wherever possible.
- Lay up walls plumb and true with courses level, accurately spaced and coordinated with other work.
- 6. Provide templates made of steel studs for plumbing of two-story masonry openings.
- 7. Pattern Bond: Lay exposed masonry patterns as noted on drawings. If not shown, provide running bond. Lay concealed concrete block with all units in a wythe bonded by lapping not less than two (2) inches. Bond and interlock each course of each wythe at corners. Do not use units of less than four (4) inches horizontal face dimensions at corners or jambs.
- 8. Where possible, masonry walls and partitions shall be built after all overhead ducts, pipes and conduits are in place and tested. Masonry shall be neatly built around the items above. Walls and partitions shall be plumb, true to line and free from defects such as open cells, voids, dry joints and other similar defects. In rooms and spaces scheduled to have concrete block finish, all such surfaces including upper wall surfaces up to termination of structural ceiling in spaces without suspended ceilings, shall be made suitable for paint application. Cutting of openings in walls and partitions in place shall be done only with the approval of the Architect.

# B. Mortar Bedding and Jointing

1. All joints between bricks shall be completely filled with mortar. Bed joints shall be beveled per BMI recommendations, with the brick then shoved in place. At cavity wall construction, care shall be taken that no excess mortar goes into masonry cavity. Head joints shall be

completely filled with mortar and shall be formed by applying a full coat of mortar to the entire end or the entire side, as the case requires, and then shoving the mortar covered end and/or side of the brick tightly against the bricks previously laid; the practice of "slushing" by throwing mortar into the head joints will not be permitted. All brick shall be laid without disturbing the brick previously laid. Brick shall be laid within a minute or so after the mortar is placed. Dry or butt joints will not be permitted. Grouting shall be done only as necessary. Do not slush head joints.

- 2. After brick placement, mortar squeezed out of bed joints shall be cut off before tooling.
- Lay concrete masonry units with full mortar coverage on horizontal and vertical face shells.
   Bed webs in mortar in starting course on exterior walls and in all courses of piers, columns
   and pilasters, where solid CMU is used and where adjacent to cells or cavities to be
   reinforced or filled with concrete or grout.
  - a. To ensure alignment of brick and block coursing, adjust block back-up by cutting block to insure alignment of coursing or use adjustable anchorage.
- 4. Lay masonry walls with 3/8" joints unless otherwise shown on drawings.
- 5. Tool exposed joints slightly concave after the mortar joint is thumbprint hard. Concealed joints shall be struck flush.
- 6. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.
- C. Stopping and Resuming Work: Rake back 1/2 brick length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.

## D. Built-In Work

- 1. As the work progresses, build in items specified under this and other Sections of these specifications. Fill in solidly with masonry around built-in items.
- 2. Mortar in door frames, access doors, louvers and other metal items embedded or built into masonry work solidly with mortar as the masonry units are laid up.
- 3. Grout under lintels, bearing plates, and steel bearing on masonry with solid bed grout.
- 4. Sleeves, pipes, ducts and all other items which pass through masonry walls shall be caulked with interior grade sealant meeting requirements of Section 079200, so as to be air tight and prevent air leakage. Refer to Section 078413 for packing of voids in rated masonry walls.
- Fill vertical cells of masonry units solid with grout which have anchoring, reinforcing rods, supporting or hanging devices embedded in the cell including stone anchors and window or curtain wall anchors.

- 6. Fill vertical cells of masonry units solid with mortar on each side of door frames to sixteen (16) inches beyond.
- Unless otherwise noted, fill vertical cells of masonry units solid with grout which are below steel bearing plates, steel beams, and ends of lintels, to eight (8) inches beyond bearing and from floor to bearing.
- 8. Place wire mesh in horizontal joint below masonry unit cells to be filled with mortar, to prevent mortar from dropping into unfilled cells below.
- 9. Masonry indicated as being reinforced shall have all voids filled solid with grout. Grout shall be consolidated in place by vibration or other methods which insure complete filling of cells. When the least clear dimension of the grouted cell is less than two (2) inches, the maximum height of grout pour shall not exceed twelve (12) inches. When the least clear dimension is two (2) inches or more, maximum height of grout pour shall not exceed forty-eight (48) inches. When grouting is stopped for one (1) hour or longer, the grout pour shall be stopped 1-1/2" below the top of a masonry unit. Vertical bar reinforcing shall be accurately placed and held in position while being grouted, and shall be in place before grouting starts. All such reinforcing shall have a minimum clear cover of 5/8". Lap all bars a minimum of forty (40) bar diameters and provide steel spacer ties (not to exceed 192 bar diameter) to secure and position all vertical steel and prevent displacement during grouting. Provide continuous horizontal reinforcement embedded in mortar joints every second course.

## E. Cutting and Patching

- 1. All exposed masonry which requires cutting or fitting shall be cut accurately to size with motorized carborundum or diamond saw, producing cut edges.
- 2. Do not saw cut any masonry openings in face brick construction without Architect's approval and after a procedure has been reviewed and approved.
- 3. Holes made in exposed masonry units for attachment of handrail brackets and similar items shall be neatly drilled to proper size.
- 4. All masonry which requires patching in exposed work, if approved by Architect, shall be patched neatly with mortar to match appearance of masonry as closely as possible and to the Architect's satisfaction. Rake back joints and use pointing mortar to match as required.

# F. Solid Wall Construction

- 1. Fill the vertical longitudinal joint between wythes solidly with mortar by parging the in-place wythe and shoving units into the parging.
- 2. Tie wythes with continuous horizontal reinforcement embedded in mortar joints sixteen (16) inches o.c. vertically.

# G. Cavity Walls

- Two wythes of masonry cavity walls shall be securely tied together by horizontal joint reinforcement and ties anchored to reinforcement, as herein specified, spaced every other block course.
  - a. Where cavity back-up is concrete use ties specified herein spaced sixteen (16) inches o.c. both directions.
- 2. Cavity between facing and backing wythe shall be kept clean and clear of all mortar droppings, and no mortar ledges shall project into the cavity. Temporary wood strips, cut to width of cavity and fitted with lift-up wires, shall be laid on the joint reinforcement and carefully lifted out before placement of the next layer of reinforcement. Any projecting mortar shall be spread over the back of the outer wythe immediately following the setting of the masonry unit.
  - a. Cavity drainage material shall be installed at the bottom of each cavity over the flashing to protect weep holes.
  - b. Drainage mat shall be installed in any cavity less than 2" wide. Shingle drainage mat and affix using brick masonry anchor assembly. Cut mat around brick ties so that it sits tight against insulation.
- 3. At cavity and solid walls adjacent to window openings fill block solid with mortar where window anchors are to be located. Coordinate with window subcontractor.
- 4. Concrete block back-up at cavity wall construction shall be anchored to slab at top with dovetail anchors spaced sixteen (16) inches o.c.
- 5. Anchor CMU back-up with anchors as specified herein.
- 6. Where stone veneer, as specified in Section 044200, is used in a cavity wall configuration, back-up block shall be reinforced every block course.
- 7. Refer to Section 072100, "Thermal Insulation," for material and installation of cavity wall insulation.

# H. Interior Block Partitions

- Build to full height unless otherwise shown on drawings. At non-rated partitions fill void between CMU and structural deck with continuous neoprene filler as specified herein. At fire rated partitions, fill void with fire stop material meeting the requirements of Section 078413. Fasten to structure at top of partition using steel angles as specified herein.
- 2. Provide continuous horizontal joint reinforcing every other block course, except as otherwise noted. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8". Lap reinforcement a minimum of six (6) inches at ends of units.

3. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.

#### 4. Corners

- a. Provide interlocking masonry unit bond in each course at corners.
- b. Provide continuity at corners with prefabricated "L" reinforcement units, in addition to masonry bonding.

# 5. Intersecting and Abutting Walls

- Unless vertical control joints are shown as part of structural frame, provide interlocking masonry bond. Provide starters and special shapes as shown on the drawings to bond these walls.
- b. In addition to masonry bonding, provide horizontal reinforcement using prefabricated "T" units at interior partitions.

# I. Ties and Anchors for Masonry Construction

- Provide ties and anchors as shown or specified, but not less than one metal tie, spaced not
  to exceed sixteen (16) inches o.c. horizontally and/or vertically. Provide additional ties
  within 1'-0" of all openings and adjacent to expansion joints and spaced not more than 16"
  apart around perimeter of openings.
- 2. Anchoring Masonry to Structure: Provide an open space not less than 1/2" in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.
- 3. Attach brick veneer to cold formed metal framing by anchoring brick to studs using specified anchors penetrating through sheathing and through flange of stud. Prior to application of anchors cover sheathing and vapor barrier with tape specified herein. Space anchors 8" o.c. at each stud; provide stainless steel screw anchors for attaching anchor to studs.

# J. Control and Expansion Joints

- 1. Provide expansion, control and isolation joints in masonry as shown. Build in related items as the masonry work progresses.
- 2. CMU Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 40'-0" o.c. In addition, locate joints at points of natural weakness in the masonry work, including the following:
  - a. At structural column or joint between bay.
  - b. Above control joints in the supporting structure.

- c. Above major openings at end of lintels upward and below at ends of sills downward. Place at one side of jamb for openings not less than 6'-0" wide and at both sides for openings over 6'-0" wide.
- d. At reduction of wall thickness.
- e. Where masonry abuts supporting structure.
- f. If additional joints are required, indicate same on approved shop drawings.
- 3. Brick Veneer Expansion Joint Spacing: Vertical expansion joints in brick veneer construction shall be located maximum 20'-0" o.c. unless otherwise noted in addition to expansion joints located within 2'-0" of each corner of the building.

#### K. Lintels

- 1. Install loose steel lintels furnished by Section 055000, allowing eight (8) inch bearing at ends.
- 2. For concrete block walls, use specially formed U-shaped concrete block lintel units with reinforcing bars in accordance with the following table, filled with grout.

Number and Size of Reinforcing Bars Required at Concrete Block Lintels				
Maximum Clearance Span	Wall Width	Rebar No Size		
2'-0" to 6'-0" 6'-0" to 8'-0"	6"	2 - #3 2 - #4		
2'-0" to 6'-0" 6'-0" to 8'-0"	8"	2 - #3 2 - #4		
2'-0" to 6'-0" 6'-0" to 8'-0"	12"	3 - #3 3- #4		

# 3.5 FLASHING/WEEP HOLES

- A. General: Install embedded flashing and weep holes in masonry at relieving angles, shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated. Space weeps 16" o.c. unless otherwise shown on drawings.
- B. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing.
- C. Flashing shall be placed, generally, at bottoms of cavity wall construction, over all wall openings, window jambs, at sills of window, and in other locations where indicated on the drawings. Flashing shall overlap a minimum of 6". At bottoms of cavity walls, the flashing shall be built extending from the exterior face of the brick, up and into the mortar joint 2" at the inner wythe of

the CMU back-up; at sheathed areas attached with pressure bar. At concrete spandrel beams and columns the flashing shall be installed with a termination bar. Extreme care shall be exercised in placing the masonry materials not to damage the flashing. Flashing damaged during the masonry erection shall be repaired or replaced by the Contractor at no additional cost to the Owner. Discontinuous flashing shall terminate with an end dam in a head joint, rising at least 1".

- D. When spanning an air space, flashing shall be supported with a mortar wash, insulation or treated wood blocking.
- E. Where flashing is penetrated by anchors, patch flashings at penetration using adhesive and mastic recommended by the manufacturer to insure watertight seal.
- F. Install flashing in accordance with manufacturer's instructions, using adhesive, primer, thinner, cleaner and mastic as recommended by flashing manufacturer.
  - 1. Flashing shall overlap adjacent piece of flashing a minimum of 6".
- G. Provide drip edge when flashing extends beyond face of brick.

## 3.6 CANTS

A. Provide specified mortar for cement cants at beams and other projections in elevator shafts, where adjoining wall is of masonry construction. Cants shall slope twenty (20) degrees from the horizontal.

#### 3.7 CLEANING, PROTECTION, ADJUSTMENT

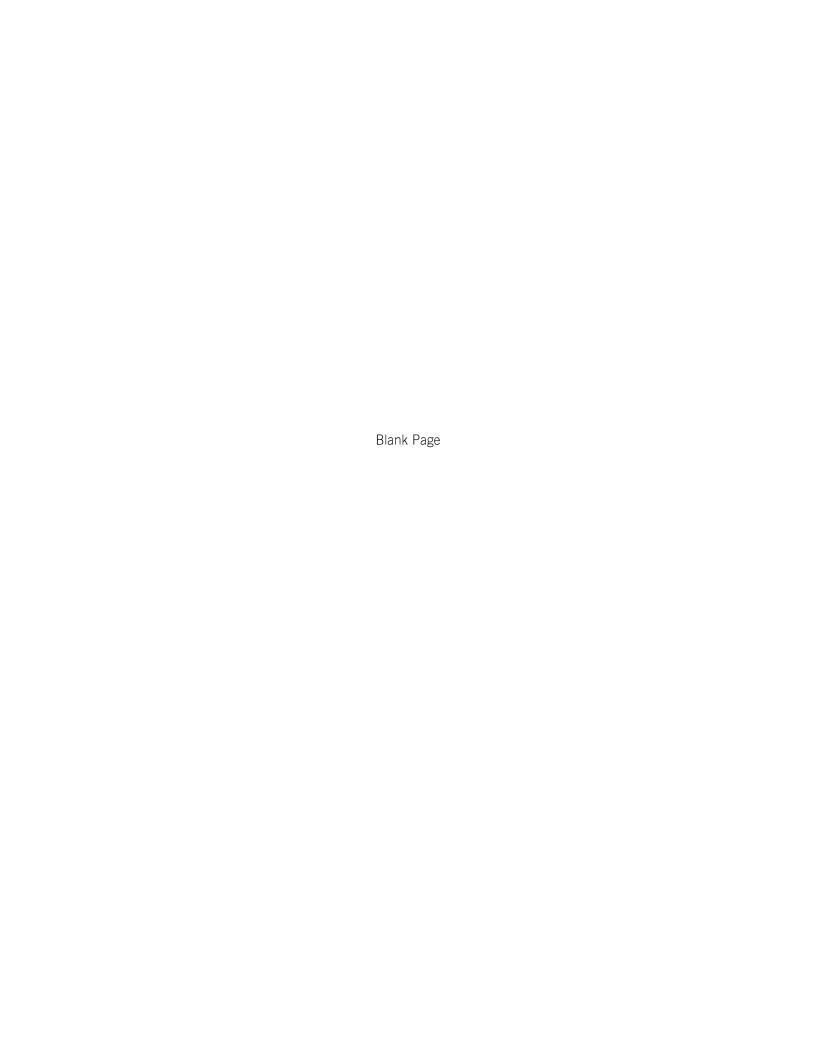
# A. Protection

- 1. The Contractor shall take adequate precautions for the protection of all surfaces against mortar spatter, and shall immediately remove any such spatter should it inadvertently occur, leaving no stain or discoloration.
- 2. Excess mortar shall be wiped off the masonry surfaces as the work progresses.
- 3. Wood coverings shall be placed over all such masonry surfaces as are likely to be damaged during the progress of the entire project.
- 4. Protective measures shall be performed in a manner satisfactory to the Architect.
- 5. Damaged masonry units shall be replaced to satisfaction of the Architect.
- 6. Exterior masonry walls shall be draped with waterproof covering until copings are in place, to prevent water penetration in cavity.
- B. Cleaning of Masonry: Upon completion, all exposed masonry shall be thoroughly cleaned following recommendations of the BIA Technical Note No. 20. Before applying any cleaning agent to the entire wall, it shall be applied to a sample wall area of approximately 4' x 4' in a

location approved by the Architect. No further cleaning work may proceed until the sample area has been approved by the Architect, after which time the same cleaning materials and method shall be used on the remaining wall area. If stiff brushes and water do not suffice, the surface shall be thoroughly saturated with clear water and then scrubbed with a solution of an approved detergent masonry cleaner, "Vana Trol" made by ProSoCo Inc. or made by Diedrich, mixed as per manufacturer's directions, followed immediately by a thorough rinsing with clear water. All lintels and other corrodible parts shall be thoroughly protected during cleaning.

- 1. Unless otherwise required by cleaning agent manufacturer use only low pressure device (30 to 50 psi) for application of cleaning agent and water rinsing.
- C. Pointing: Point any defective joint with mortar identical with that specified for that joint.

**END OF SECTION** 



# PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work..
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the exterior stone cladding as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Exterior stone facing panels, fascias, special shapes, piecework, and all other stone elements for exterior stone walls.
  - 2. Furnishing, cutting, fabricating, delivery, and setting of all stonework.

- Anchors, dowels, cramps, bolts, nuts, threaded studs, expansion shields, inserts, loose clips, loose angles, struts, relieving angles, support angles, shims, steel frame supports, wire anchors, tape, and all other fastening devices and accessories necessary for complete setting and anchorage of stone wall facings to masonry and concrete back-up.
- 4. Protection of stone during transit, storage, erection, and installation. Cleaning of stone prior to acceptance.

# 1.3 RELATED SECTIONS

- A. Cast-in-Place Concrete Section 033000.
- B. Unit Masonry Section 042000.
- C. Cast Stone Section 047200.
- D. Sheet Metal Flashing Section 076200.
- E. Sealing of stone-to-stone joints Section 079200.

## 1.4 DOCUMENTATION

- A. The drawings (floor plans and design details) and specifications are an outline of the criteria and performance requirements of the work. The requirements shown by the details are intended to establish basic dimensions of the module and the sight lines and profiles of members. Within these parameters, the Contractor is responsible for the design and engineering of the system, including whatever modifications or additions may be required to meet the specified requirements and maintain the visual design concept for the entire work of this Section.
- B. It is recognized that the design details do not cover every condition. It is, however, intended that any conditions not detailed shall be developed through the Contractor's shop drawings to the same level of aesthetics, and in compliance with performance criteria, as indicated for detailed areas and stipulated in these specifications. The Contractor, by accepting a contract for the work, acknowledges this and agrees that the Architect shall have the final say as to all matters whether detailed or not on the design drawings.

# 1.5 QUALITY ASSURANCE

A. The work of this Section shall be performed by Subcontractors who are regularly engaged in the engineering, manufacture, fabrication, finishing, installation, and sealing of similar work. Each subcontractor shall demonstrate to satisfaction of the Architect that he has successfully performed on comparable projects over the previous five years. All fabricating shall be done in Subcontractor's own plant. Further subcontracting of any work included hereunder is specifically prohibited, except for that which may be approved by the Architect in writing prior to award of this contract.

- B. The Architect reserves the right to visit the fabricating facilities of the Subcontractor at any time when the work is in progress. All shop and field materials and workmanship shall be subject to inspection by the Architect and his representatives at all times. Such inspections do not relieve the Contractor from obligations to provide materials conforming to all requirements of the Contract Documents.
- C. The Contractor, by commencing the work of this Section, assumes overall responsibility, as part of his warranty of the work, to assure that all assemblies, components and parts shown or required within the work of this Section, comply with the Contract Documents. The Contractor shall further warrant:
  - 1. That all components, specified or required to satisfactorily complete the installation, are compatible with each other and with the conditions of installation and expected use.
  - 2. The overall effective integration and correctness of individual parts and the whole of the system.
  - 3. Compatibility with adjoining substrates, materials and work of other trades.
  - 4. There shall be no premature material failure due to improper design and fabrication of the stone. All materials are to fully perform to their normal life expectancy.
  - 5. Each piece of stone shall be subject to the Architect's approval, and any piece or pieces which may be rejected after having been set shall be carefully cut out and replaced with new suitable stone without delay, and without cost to the Owner. Any piece or pieces damaged in the removal and resetting of defective pieces shall also be removed, and suitable, approved pieces provided and set.
- D. Architect's inspection of the stone does not relieve the Contractor from his responsibility to provide all stonework in accordance with the approved samples and shop drawings.
- E. Examination Criteria: All examinations, selections and approvals shall be for the purpose of achieving a final appearance of stone with the greatest possible uniformity, and will be based upon the following criteria:
  - 1. Color within approved, pre-selected color ranges and finish.
  - 2. Sequence matching of adjacent stone units, as approved by the Architect.
  - 3. Only one source of each type of stone shall be used throughout the work. Stone shall match the type, pattern, color, texture and finish of samples available for inspection in the office of the Architect.
  - 4. Conformance to approved shop drawings and details within specified dimensions and tolerances.

- 5. Other criteria as specified in Part 2 Products, herein.
- F. Pre-Installation Conference: Hold a pre-installation conference at the site with Architect and Owner's representative prior to starting work on site.

## 1.6 SUBMITTALS

- A. Shop Drawings: Prior to construction of mock-up, submit shop drawings for the fabrication and installation of all work and associated components. Include:
  - 1. Wall elevations at 1/4" scale, typical unit elevation at 1" scale.
  - 2. Show details of all conditions for every member, joint, anchorage and provision for expansion and contraction and joint treatment.
  - Include coordination details for related and adjoining work, insert drawings and erection diagrams. Show relative layout for all adjacent walls, beams, columns and slabs, all correctly dimensioned.
  - 4. Stone: Submit complete cutting and setting drawings to Architect for approval. Shop sizes, shapes, thicknesses, jointing, anchoring, connection with other work, typical and special anchoring details, supports, dimensions, setting numbers, and color range for each piece of stone. Clearly indicate dimensions for locating slots in stone and for locating inserts to be built into concrete and masonry. Do not fabricate any stone (except for samples) until shop drawings have been approved by the Architect. Shop drawings shall be based upon actual field measurements to determine exact dimension of each stone piece and anchorage required. Dimensions shown on shop drawings shall be actual field dimensions.
- B. Provide structural calculations, prepared by a Professional Engineer licensed in Connecticut, prepared in compliance with referenced documents and these specifications. Where specifications and code differ, the more stringent requirement shall govern. Calculations shall be legible and shall incorporate sufficient cross references to shop drawings to make the calculations readily understandable and reviewable. Calculations shall include the following information:
  - 1. Analysis for all applicable loads on substrate.
  - 2. Analysis for all applicable loads on anchors.
  - 3. Analysis of stress in stone and required safety factors.
- C. Allowable stresses for stone shall be based upon material properties required herewith and computed as follows:

Coefficient of Variation (Standard Deviation/Mean)

Modulus of Rupture Safety Factor Required

0-5 percent

Mean

2.0

5-10 percent	Mean	2.5
10-15 percent	Mean	3.75
15-20 percent	Mean	5.0

- D. Safety factors required at anchor locations shall be 2.0 times the values noted above for the allowable stresses in the field of the panel.
- E. Calculation of allowable stresses on stone shall be based upon the minimum thickness (nominal thickness minus the thickness tolerance). Under no condition shall stone thickness be less than that indicated on the Drawings.
- F. Review of calculations and shop drawings by the Architect will not relieve the Contractor of any responsibilities for providing a system within the required performance requirements. Calculations shall be signed and sealed by the Contractor's Engineer.

#### G. Manufacturer's Data

- Submit copies of manufacturer's specifications and installation instructions for each stonework accessory required. Include data substantiating that materials comply with specified requirements. Indicate that installer has received copy of manufacturer's instructions.
- 2. Manufacturer's instructions for handling and storage at job site; installation and protection of stone. Indicate that erector of stonework has received a copy of each instruction.

# H. Samples

- 1. Submit samples of all materials and finishes and details. Samples include standard submission samples, visual mock-up samples, sample slabs, production samples, and additional samples as described below.
- 2. Samples shall demonstrate the complete range of visual properties of the material and finish as specified in PART 2 MATERIALS.
- 3. Samples shall represent the single exposed surface grain, i.e. head, rift or lift, as proposed by the Contractor and approved by the Architect.
- 4. Sample slabs shall be displayed at the quarry or the fabrication plant as selected by the Architect.
- 5. First Submission Sample Slabs: The first submission shall be taken from representative areas (e.g. top, middle or bottom) of each existing or proposed quarry work station required to provide Dimension Stone, and are to represent the proposed range of visual properties, including color, value (lightness/darkness), figuring, grain direction, dark inclusions, etc. Sample slabs shall be the full dimensions of the quarried blocks and finished as specified in PART 2 MATERIALS.

- 6. Subsequent to the Architect's approval of the First Submission Sample Slabs, one identical set of control samples of the approved range shall be submitted for approval and provided to each of the following: the Owner, the Architect, and the General Contractor. The fabricator shall maintain an original sample set until completion of the Project.
- 7. Samples shall be the following sizes:
  - a. Standard Submission Samples: 12 inches x 12 inches (5 copies).
  - b. Sample Slabs
    - 1). Sample slabs shall be full quarried block dimension, job thickness, as described above.
    - 2). Sample slabs shall be from at least 10 different blocks.
- 8. Range Samples: Range samples shall be 60 inches x 60 inches x job thickness; each set to have at least 5 examples (from at least 5 different blocks) representing the approved range of color, graining, and tonality.
- 9. Additional Samples: The Contractor for the Work of this Section shall have available an adequate quantity of matching approved samples as in Item a. above, to be provided in order to enable the Architect to coordinate the construction and finishes of other trades.

# 1.7 FABRICATION AND ERECTION TOLERANCES

- A. Tolerances are as follows:
  - 1. Except as noted, all joints shall be 3/8".
  - 2. Stone dimension tolerance shall be +0, -1/16" in both directions with 90 deg. angle for all corners.
  - 3. Stone face dimension tolerance (flatness) shall be +0, -1/16" in all directions.
  - 4. Stone thickness tolerance shall be -1/4", +1/4".
- B. Variation From Plumb: For lines and surfaces of walls and arrises, do not exceed 1/8" in 20 ft. max. For external corners, expansion joints and other conspicuous lines, do not exceed 1/8" in any story or 20 ft. max.
- C. Variation of Linear Building Line: For position shown in plan and related portion of grid lines, walls and partitions, do not exceed 1/8" in any bay or 30 ft. max.
- D. Offset at Joints: Do not exceed plus or minus 1/32".
- E. Slope, Splay, and Miter Cuts: Plus or minus 1.5 degrees.
- F. Square Cuts: Plus or minus 1/16" per 3'-0".

## 1.8 PERFORMANCE REQUIREMENTS

A. Structural Requirements: The work, as erected, shall be designed to withstand a lateral force of 30 psf (or greater if required by Code) applied over field surface normal to face of stone. Deflection under this load shall be limited to L/360 or 3/8" whichever is less.

## B. Provision for Thermal Movements

- The work shall be designed to provide for such expansion and contraction of component material, as will be caused by a surface temperature ranging from -20 deg. F. to +180 deg. F., without causing buckling, stresses on glass, failure of joint seals, undue stress on structural elements, damaging loads on fasteners, reduction of performance or other detrimental effects.
- 2. The amount of such movement that is accommodated in the Contractor's design and method of accommodating it shall be identified on Contractor's submittal drawings, and shall be accompanied by thermal calculations.

## C. Provision for Movement of the Structure

- The work will be designed to accommodate dead load and live load bending deflection and column shortening as follows:
  - a. Anticipated interstory differential vertical movement Slab Deflection:

Column shortening:

- b. Anticipated interstory differential lateral movement:
- c. All values are maximum values and include long term creep effects.
- 2. The above movements are net structural frame motions and not joint sizes
- 3. The amount of such movement that is accommodated in the Contractor's design shall be identified on the Contractor's submittal drawings.
- D. Methods and fabrication and assembly (except as specified herein) shall be at the discretion of the Contractor provided that the visible architectural effect is not changed, the work of other Contractors is not affected and the strength qualities, as demonstrated by engineering calculations are not reduced.
- E. Remedial measures, which may be necessary on the building, shall maintain standards of quality and durability and are subject to approval by the Architect.
- F. Anchors: Adequate number and size of anchors shall be provided to satisfy the load requirements and design criteria.
- G. Variations in Structure: The work shall be designed to accommodate variation in location of surrounding and supporting work, as defined as allowable variations in the work, as specified in other Sections of the project Specifications.

## 1.9 CODES AND STANDARDS

- A. All work shall be performed in accordance with the prevailing Building Code, or the requirements of this Specification, whichever are more stringent.
- B. Stone Cladding System shall conform to, but not be limited to, the following codes and standards:
  - 1. National Building Granite Quarries Assoc. (NBGQA).
  - 2. American National Standards Institute (ANSI).
  - 3. Marble Institute of America (MIA) "Dimension Stone Design Manual," latest edition.
  - Building Stone Institute (BSI).
  - 5. American Society for Testing and Materials (ASTM).

# 1.10 STONE TESTING

A. The Contractor shall execute a comprehensive testing program to identify the material properties and ensure that acceptable properties are maintained throughout production.

# B. Material Properties

1. The following material properties shall be identified for the stone:

	Material Property	Test Method	Test Samples
a.	Absorption and Bulk Specific Gravity	ASTM C 97	5
b.	Modulus of Rupture	ASTM C 99	20
C.	Modulus of Rupture (modified for job thickness and finish)	ASTM C 99	20
d.	Compressive Strength	ASTM C 170	20
e.	Flexural Strength	ASTM C 880	20
f.	Modulus of Elasticity (performed concurrently with C 880)	ASTM C 580	20
g.	Petrology	ASTM C 295	

# 2. Product Testing

- a. Provide a testing program for modulus of rupture/flexural strength during production. The Contractor shall propose a program indicating frequency of testing for approval by the Architects after selection of the stone is finalized.
- b. Testing program shall consist of two parts:
  - 1). Testing to confirm material properties of the production stone.
  - 2). Intermittent testing during production to confirm material properties.

- 3). Modulus of rupture/flexural strength shall be tested for the worst case loading condition.
- 4). Testing should be to the following standard:

(a). Flexural Strength ASTM C 880/580 Samples Tested 20 for first test, (modified for thickness and span) 5 thereafter.

(b). Modulus of Rupture ASTM C 99 20 for first test,

(modified for thickness and finish) 5 thereafter.

- 5). Material properties shall be derived from testing conducted by an independent certified testing laboratory. Properties reports shall indicate the laboratory name, address, date of testing, method of testing and the description and number of test specimens for each property tested.
- 6). Strength properties shall be indicated for each specimen tested, and expressed as a mean with standard deviation and coefficient of variation for each condition tested.

# 3. Adhesively-Bonded Stone

- a. The Contractor shall propose a comprehensive testing program for epoxymitered corners for approval by the Architect. The testing program shall include pull-out tests for shear, tension, and shear and tension combined. Test specimens shall be subjected to a series of cycles of wet and dry conditioning after epoxy adhesion and before testing for failure.
- b. A minimum of five (5) full-size specimens shall be tested.

## 4. Stone Anchors

- a. For each type of stone anchor, a series of tests shall be performed including:
  - 1). Shear.
  - 2). Tension.
  - 3). Shear and tension combined.
- Anchors shall be tested to destruction.
- c. A minimum of 5 specimens of each anchor type shall be tested.
- d. Submit test method for approval by the Architect.

## 1.11 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect stone during storage and construction against moisture, soiling, staining, and physical damage.
- B. Handle stone to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of stone with wood or other rigid materials. Lift with wide-belt type slings wherever possible; do not use wire rope or ropes containing tar or other substances which might cause staining. If required, use wood rollers and provide cushion at end of wood slides.

- C. Store stone on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones. Protect stored stone from weather with waterproof, non-staining covers or enclosures, but allow air to circulate around stone.
- D. Protect mortar materials and stonework accessories from weather, moisture, and contamination with foreign materials.

## 1.12 JOB CONDITIONS

- A. Installer must review installation procedures and coordination with other work with Contractor and other subcontractors whose work will be affected by stonework.
- B. Schedule a preinstallation meeting with Owner and Architect prior to starting of work.

## 1.13 PROTECTION

- A. Protect adjacent surfaces from damage. Protect exposed surfaces of stone units from damage or defacement. Prevent materials used for installing work of this Section from staining or damaging the exposed surfaces of stone units or the exposed surfaces of the adjoining construction.
- B. Protect all stonework from other materials that will cause staining or defacement. Stone subject to damage after setting shall be properly covered or protected.
- C. No lumber or other material liable to stain or deface the stone shall be used.

# 1.14 GUARANTEE

- A. Unless stated otherwise in these Specifications, guarantee shall state that all work is in accord with drawings and Specifications, as amended by any changes thereto authorized by the Architect, free from defects in materials and workmanship for a period of five (5) years from date of acceptance of the work by the Owner or failure of system to meet performance requirements. Contractor shall agree to repair or replace defective materials and workmanship during the guarantee period at no additional cost to the Owner.
- B. Defective materials and workmanship are hereby defined to include evidence of abnormal deterioration, aging, structural failure of components resulting from exposure to normal load and forces, failure of operating parts to function normally, sealant failures, deterioration or discoloration of finishes in excess of normal aging, and failure to fulfill other specified performance.
- C. Contractor and respective subcontractors shall be responsible for damage to the building and furnishings occasioned by defective materials or workmanship or damage as part of repairs to the stone cladding.

D. The guarantee, the enforcement or lack of enforcement thereof, shall not deprive the Owner of other actions, rights or remedies available to him. Guarantee shall be in form approved by the Architect.

# PART 2 PRODUCTS

## 2.1 STONE

- A. Stone shall be Granite conforming to ASTM C 615, of size and thickness shown on drawings.
  - 1. Finish: Stone shall have thermal finish on all exposed surfaces; concealed surfaces may be sawn. Edges to receive grout or sealant shall be sawn.
  - 2. Type: Jet Mist.
  - 3. Thickness: 2" and 4"; see Drawings.
  - 4. Corner Type: Per detail drawings.

# B. Quarrying Supervision

- 1. Quarrying shall be supervised and coordinated by the stone fabricator to insure that the as-quarried block orientations will yield finished material with characteristics as described herein.
- 2. All stone shall be cut from matched blocks. Matched blocks shall mean blocks extracted from a single bed of stratum in the quarry. The use of blocks chosen at random, though similar in general character and color to that of the approved stone shall not be permitted, except by written permission of the Architect.

## C. Examinations

- 1. Examination at the Quarry: Quarried blocks shall be made available for inspection by the Architect at his request.
- Examination at the Fabrication Plant: Production units shall be made available for inspection by the Architect at his request. To this end, the Contractor shall, after approval of final shop drawings, advise the Architect when production has begun and of the earliest possible opportunity to inspect a representative sampling of production work.
- 3. Contractor shall provide lighting that is sufficient in intensity and color range to permit an adequate examination to the satisfaction of the Architect.
- D. Visual Criteria for Stone: All examinations, selections, and approvals shall be for the purpose of achieving a final appearance of stone with greatest possible uniformity, and will be based upon the following criteria:

- All stone shall be of sound stock and uniform texture, and shall be free from holes, seams, shakes, clay pockets, spalls, stains, starts, and other defects which would impair the strength, durability, and appearance of the work, as determined by the Architect.
- 2. Inherent variations characteristic of the stone and the quarry from which the stone is to be obtained shall be brought to the attention of the Architect at the time the samples are submitted for approval, and shall be subject to approval of the Architect.
- 3. All stone shall be selected for background color, veining, marking and matching, shall run in even shades, and shall be set accordingly.

# 2.2 ACCESSORY MATERIALS FOR STONEWORK

# A. Mortar Materials

- 1. White Portland Cement: ASTM C 150, Type 1, non-staining. Cement shall in no case contain more than 0.03% by weight of soluble alkali (calculated as Na<sub>2</sub>O). Submit mill certificates of cement and certified analysis from an approved testing laboratory.
- 2. Sand: ASTM C 144, except graded with 100% passing No. 16 sieve, non-staining.
- 3. Hydrated Lime: ASTM C 207, Type S.
- 4. Water: Potable, clear and free of deleterious materials which would impair the quality of the mortar.
- 5. For colored pointing mortar, provide integral, non-fading colorant made by Davis Color, Spec Mix or Solomon Colors; color selected by the Architect.

# B. Stone Support

- Manufacturer and General: Stone support systems, anchors and accessories shall be manufactured by a company specializing in the design and fabrication of stone approved by the Architect. Provide all fastening devices, wire anchors, support angles, relieving angles, anchors, coping anchors, dowels, cramps, bolts, nuts, shims, expansion shields, flashing, etc., necessary to properly secure stone walls to the structure.
- 2. Stainless Steel to be used for stone supports shall conform to the following:
  - a. Sheet, Bar and Plate: AISI Type 302/304 non-magnetic, conforming to ASTM A 167.
  - b. Fasteners, Anchor Bolts, Nuts and Washers: AISI Type 302/304 non-magnetic, ASTM A 167.
  - c. Shims: AISI type 302/304, non-magnetic.

- C. Setting Pads: Lead or plastic.
- D. Weeps: Rectangular plastic cell vent, clear butyrate, 3/8 by 1-1/2 inches by thickness fo stone. made by Hohmann & Barnar, Heckman or York.
- E. Flashing: 26 ga. ASTM A 666, Type 304 stainless steel.

## 2.3 FABRICATION

- A. All stone work shall be executed by mechanics skilled in the trade. All stone shall be well cured and seasoned before cutting. Cut stone units with bed, unless otherwise approved by the Architect.
- B. Stone shall be accurately cut to sizes, shapes, profiles and dimensions. There shall be no deviation from jointing.
- C. Exposed surfaces and edges of stone units shall be free from cracks, broken corners, chipped arrises, scratches or other defects affecting appearance. Patching or filling not permitted. Edges of stone panels are to be finished.
- D. Backs of stone units shall be sawn to true planes, parallel to face plane.
- E. Cut stone units full and true on faces, reveals, beds, joint and top, to the full dimensions required by drawings. All edges shall be straight and true with sharp and true arrises. All stone shall fit together accurately.
- F. Make faces of stone units in same plane flush at joints. All finished surfaces shall be true in line and face.
- G. Sawn surfaces and edges shall be cleaned of all rust stains and iron particles.
- H. No patching or use of stone with chipped edges or faces shall be permitted.
- I. Thickness: Provide stone panel of thickness shown on drawings. Saw-cut back surfaces which will be concealed in the finished work. Provide greater stone thickness than shown where thickness shown is insufficient for the sizes or where extent of cut-outs shown decreases effective strength of the remaining material, or for proper and sufficient anchorage, suitable and adequate bearing areas for surfaces.
- J. Adhesively Bonded Units
  - 1. Adhesive shall be a 2-component epoxy resin designed specifically for structural bonding of stone units.
  - 2. Prepare stone, mix adhesive, and fabricate bonded units in accordance with the recommendations of the NBGQA and adhesive manufacturer's instructions. Color shall match stone.

- 3. Adhesively bonded units shall be fabricated with a non-continuous stone liner reinforcing that is mechanically secured to both face stones and stainless steel dowels. Size and spacing shall be designed to achieve a mechanical support should the adhesive fail.
- 4. Finish joints shall be smooth and without staining or excess adhesive on exposed surfaces. Remove adhesive from exposed joints after hardening and leave finish surfaces without damage, or impairment of the polished finish.

# 2.4 CUTTING, DRILLING AND FITTING

- A. Provide holes and sinkages required for anchors, dowels, other devices required to support and/or suspend stone, and to accommodate other items which connect to or penetrate the stone.
- B. Include all cutting, drilling and fitting of stone work required to accommodate the work of other trades. In cutting and fitting, carefully cut and grind edges to a neat tight fit. Do cutting in such manner so as not to impair strength or appearance of stone. Use physical templates for all cutting and drilling; obtain required templates from proper trades.
- C. Refer to Article 1.7 herein for fabrication tolerances.

## PART 3 EXECUTION

## 3.1 INSPECTION

- A. Examine the areas and conditions where stone cladding is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.
- B. Review installation procedures and coordinate with other work, and with other trades whose work will be affected by the stonework.
- C. Advise other trades of requirements relating to their placement of any inserts which are to be used for anchoring and supporting of stonework.

## 3.2 INSTALLATION

# A. Sample Section of Stone Cladding

- 1. Prior to general installation of stone cladding, install a section of the wall (used as "control section") in accordance with final approved shop drawings. Architect shall be informed of time and place of such installation of control section.
- 2. Obtain Architect's acceptance of visual qualities of control section before start of general installation. Replace unsatisfactory work, as directed, until acceptable to

the Architect. Retain control section in permanent work as a standard for judging completed work.

- B. Qualification of Workmen: All work shall be performed by skilled workmen, especially trained and experienced in this type of work.
- C. Lines and Grades: Benchmarks for elevations and building line offset marks for alignment shall be established on each floor level by the Contractor, who shall be responsible for their accuracy. Should any error be found in their location, the Installation Contractor shall so notify the Contractor in writing and installation work shall not proceed in the affected areas until the errors have been corrected.
- D. Workmanship: All parts of the work shall be erected plumb and true, in proper alignment and relation to established lines and grades, and as shown on approved shop and/or erection drawings.

#### E. Erection Tolerances

- Permissible dimensional tolerance in the building frame and/or work surrounding or supporting the work of this Section are stated in the appropriate Trade Sections of these Specifications.
- 2. The work shall be designed to accommodate all tolerances and anticipate dead and live load movement, creep, sway and torsion of the structure without any harmful effects.
- 3. Refer to Article 1.7 herein for stone erection tolerances.
- F. Do not use stone units with chips, cracks, voids, stains or other defects which might be visible in the finished work. Patching or hiding defects in stone will not be permitted.
- G. Clean stone before setting by scrubbing with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh fillers or abrasives. If not thoroughly wet at time of setting, drench or sponge stone. Do not wet expansion or control joint surfaces.

## 3.3 SETTING STONE

- A. Setting Mortar: Conform to ASTM C 270 Type N, Portland cement/lime mortar.
- B. Pointing Mortar
  - 1. 1 part non-staining white cement with color ingredient
  - 2. 6 parts clean selected white sand to be compatible with the colored cement; sand to pass No. 16 sieve
  - 3. 1 part hydrated lime to make as still a mix as can be worked
  - 4. Water as required

# C. Mixing

- 1. Mix cementitious materials, admixtures, and aggregate with the proper amount of water consistency which will result in a homogeneous, still and plastic mix.
- 2. Mix mortar in small batches by approved mechanical mixes. Monitor volume of materials per batch carefully.
- 3. Retempering of mortar will not be permitted, and mortar that has been allowed to stand more than one or two hours shall not be used. Mortar shall be mixed and kept tempered so that it will, at all times, contain as much water as it is able to carry.

#### D. Anchors

- A minimum of 2 anchors shall be required on all pieces up to 2 square feet in area.
- 2. A minimum of 4 anchors shall be required on all pieces up to 20 square feet in area.
- 3. A minimum of 2 additional anchors shall be required on each additional 10 square feet.
- E. Set stone and install stone support systems in accordance with drawings and final shop drawings for stonework. Provide anchors, supports, fasteners, and other attachments shown, or necessary to secure stonework in place. Shim and adjust accessories as required for proper setting of stone. Completely fill holes, slots and other sinkages for anchors, dowels, fasteners, and supports with mortar during setting of stones.
- F. Before setting in the wall, all stones shall be thoroughly cleaned on all exposed surfaces by washing with fiber brush and soap powder, followed by a thorough drenching with clear water.
- G. All stone joint surfaces not thoroughly wet shall be drenched with clear water just prior to setting.
- H. Every stone shall be set in full beds of mortar with all joints slushed full. All joints shall be 3/8" unless otherwise noted.
- I. Lead or plastic setting pads shall be placed under heavy stones, in sufficient quantity to avoid squeezing mortar out. Heavy stones or projecting courses shall not be set until mortar in courses below has hardened sufficiently to avoid squeezing.
- J. Joints shall be raked out 1" and pointed with pointing mortar. If sealant joints are noted, joint shall be raked out full depth to receive back-up rod and sealant per Section 079200.

- K. Plastic cell vents shall be placed in joints where moisture may accumulate within the wall, such as at base of cavity, continuous angles, flashing, etc., or as shown on drawings. Space weeps 24" o.c. unless otherwise noted.
- L. Projecting stones shall be securely propped or anchored until the wall above is set.
- M. In cold weather, International Masonry Industry All-Weather Council recommendations for setting from 40 deg. F. to 20 deg. F. shall be followed, except that no additives shall be used in the setting mortar, and below 20 deg. F. all work shall be done in heated enclosures.

# 3.4 REPAIRING AND CLEANING (AFTER ERECTION)

- A. Remove and replace stone units which are broken, chipped, stained or otherwise damaged. Where directed, remove and replace units which do not match adjoining stonework. Patching or hiding defects in stone will not be permitted. Provide new matching units, install as specified and reseal joints to eliminate evidence of replacement. Reseal defective and unsatisfactory joints to provide a neat, uniform appearance.
- B. Clean vertical stonework after completion of work, using clean water and stiff-bristle brushes. Do not use wire brushes, acid type cleaning agents or other cleaning compounds with caustic or harsh fillers.

## 3.5 PROTECTION

- A. After installation and cleaning, protect stone work from damage during subsequent construction activities.
- B. Protect all stone work from other material that will cause stain.
- C. Provide protection for finished work such as jambs, exposed edges, corners, sills and all other stone liable to physical injury or staining. Protection shall include but is not limited to non-staining approved coverings, and clean non-staining wood boxing. All fastenings or hold-back devices shall be stainless steel. Fastening to stone joints is prohibited.
- D. At completion of construction work, remove all temporary protection from the work of this Section.
- E. Examine all work and repair all damage. Clean soiled or stained surfaces. In the event damage is irreparable, or soiled or stained surface cannot be cleaned, then remove and replace such items at no additional cost.

**END OF SECTION** 



## **SECTION 04 43 00**

#### STONE MASONRY

## PART 1 - GENERAL

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

## 1.2 SUMMARY

- A. Section includes the following applications of stone masonry:
  - 1. Anchored to unit masonry backup.
  - Set in mortar.
- B. Related Sections:
  - Division 04 Section "Unit Masonry" for concealed flashing horizontal joint reinforcement and veneer anchors.
  - 2. Division 07 Section "Sheet Metal Flashing and Trim" for exposed sheet metal flashing.

# 1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
  - 1. For stone varieties proposed for use on Project, include test data indicating compliance with physical properties required by referenced ASTM standards.
- B. Samples for Initial Selection: For colored mortar and other items involving color selection.
- C. Samples for Verification:
  - 1. For each stone type indicated. Include at least five samples in each set for each type of stone, exhibiting extremes of the full range of color and other visual characteristics expected in completed Work. Samples will establish the standard by which stone provided will be judged.
  - 2. For each color of mortar required. Label Samples to indicate types and amounts of pigments used.

- D. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, sources of supply, and other information as required to identify materials used. Include mix proportions for mortar and source of aggregates.
  - Submittal is for information only. Neither receipt of list nor approval of mockups constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
- E. Qualification Data: For qualified Installer.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs experienced stonemasons and stone fitters.
- B. Source Limitations for Stone: Obtain stone, regardless of finish, from one quarry, whether specified in this Section or in another Section of the Specifications, with resources to provide materials of consistent quality in appearance and physical properties. Stone must be quarried within 500 miles of project site. Provide architect with quarry address and contact information.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.
- D. Mockups: Build mockups to demonstrate aesthetic effects and set quality standards for materials and execution.
  - 1. Build mockup of typical wall area as shown on Drawings including CMU retaining wall with stone veneer on both sides and CMU cheekwall with stone veneer against cast in place staircase.
  - 2. Build mockups for each type of stone masonry in sizes approximately 60 inches (1500 mm) long by 48 inches (1200 mm) high by full thickness, including face and backup wythes and accessories.
    - a. Include stone coping at top of mockup.
    - b. Include a sealant-filled joint at least 16 inches (400 mm) long in mockup.
    - c. Include veneer anchors, flashing, and weep holes in exterior wall mockup.
    - d. Include vertical control joint in exterior wall mockup.
  - 3. Protect accepted mockups from the elements with weather-resistant membrane.
  - 4. Approval of mockups is for color, texture, and blending of stone; relationship of mortar and sealant colors to stone colors; tooling of joints; and aesthetic qualities of workmanship.

- a. Approval of mockups is also for other material and construction qualities Architect specifically approves in writing.
- b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
- 5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Preinstallation Conference: Conduct conference at Project site.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- B. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- C. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

## 1.6 PROJECT CONDITIONS

- A. Protection of Stone Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed stone masonry when construction is not in progress.
  - 1. Extend cover a minimum of 24 inches (600 mm) down both sides and hold cover securely in place.
- B. Stain Prevention: Immediately remove mortar and soil to prevent them from staining the face of stone masonry.
  - 1. Protect base of walls from rain-splashed mud and mortar splatter by coverings spread on the ground and over the wall surface.
  - 2. Protect sills, ledges, and projections from mortar droppings.
  - 3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
- C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace stone

masonry damaged by frost or freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

- 1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

# 1.7 COORDINATION

A. Advise installers of other work about specific requirements for placement of reinforcement, veneer anchors, flashing, and similar items to be built into stone masonry.

## PART 2 - PRODUCTS

#### 2.1 FIELDSTONE

- A. Provide sound natural stone as follows:
  - 1. Products: Subject to compliance with requirements, provide the following stone varieties that may be incorporated into the Work include, but are not limited to, the following:
    - a. Fieldstone shall match existing stone walls on site in size, shape, texture, color range, etc.
      - Mica Schist / Quartz Schist stone blend to match existing walls; provided by: Paramount Stone Co. 338 Courtland Avenue, Stamford, CT 06906-2250; Phone: 203-353-9199; Fax: 203-353-9094
      - Mica Schist / Quartz Schist stone blend to match existing walls; provided by: Skyline Quarry 110 Conklin Road, Stafford Springs, CT 06076; Phone: 860-875-3580
      - 3) Mica Schist / Quartz Schist stone blend to match existing walls; provided by: Connecticut Stone 138 Woodmont Road, Milfod, CT 06460; Phone: 888-817-9016
  - 2. Minimum Compressive Strength per ASTM C 170: 4000 psi (28 MPa).
  - 3. Minimum Flexural Strength per ASTM C 880
  - 4. Minimum Modulus of Rupture per ASTM C 99

# 2.2 MORTAR MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
  - Low-Alkali Cement: Not more than 0.60 percent total alkali when tested according to ASTM C 114.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or III, and hydrated lime complying with ASTM C 207.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
    - b. Lafarge North America; Eaglebond.
    - c. Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
- D. Mortar Cement: ASTM C 1329.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Lafarge North America; Mortar Cement.
    - b. Holcim (US) Inc.; Mortar Cement
    - c. Lehigh Cement Company; Mortar Cement
- E. Masonry Cement: ASTM C 91.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Essroc, Italcementi Group Masonry Cement.
    - b. Holcim (US) Inc Masonry Cement.
    - c. Lafarge North America; Masonry Cement.
    - d. Lehigh Cement Company; Masonry Cement.
- F. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in stone masonry mortar.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Davis Colors; True Tone Mortar Colors.
    - b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
    - c. Solomon Colors; SGS Mortar Colors.

- G. Colored Cement Product: Packaged blend made from portland cement and lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.
  - 1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
  - 2. Pigments shall not exceed 10 percent of portland cement by weight.
  - 3. Pigments shall not exceed 5 percent of masonry cement or mortar cement by weight.
  - 4. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Colored Portland Cement-Lime Mix:
      - 1) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
      - 2) Lafarge North America; Eaglebond.
      - 3) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
    - b. Colored Masonry Cement:
      - 1) Essroc, Italcementi Group; Brixment-in-Color.
      - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
      - 3) Lafarge North America; Magnolia Masonry Cement.
      - 4) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
    - c. Colored Mortar Cement:
      - 1) Lafarge North America; Magnolia Superbond Mortar Cement.
      - 2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Mortar Cement.
      - 3) Lehigh Cement Company; Lehigh Custom Color Mortar Cement.
- H. Aggregate: ASTM C 144 and as follows:
  - 1. For pointing mortar, use aggregate graded with 100 percent passing No. 16 (1.18-mm) sieve.
  - 2. White Aggregates: Natural white sand or ground white stone.
  - 3. Colored Aggregates: Natural-colored sand or ground marble, granite, or other sound stone; of color necessary to produce required mortar color.
- I. Latex Additive: Manufacturer's standard water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement mortar bed, and not containing a retarder.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Boiardi Products Corporation.

- b. Bonsal.
- c. Bostik Findley Inc.
- d. C-Cure.
- e. Custom Building Products.
- f. DAP Inc.
- g. Laticrete International, Inc.
- h. MAPEI Corp.
- i. Summitville Tiles, Inc.
- j. TEC Specialty Construction Brands; H. B. Fuller Company.
- J. Water: Potable.

#### 2.3 VENEER ANCHORS

## A. Materials:

- 1. Hot-Dip Galvanized-Steel Wire: ASTM A 82, with ASTM A 153/A 153M, Class B-2.
- 2. Hot-Dip Galvanized-Steel Sheet: ASTM A 1008/A 1008M, cold-rolled, carbon-steel sheet hot-dip galvanized after fabrication to comply with ASTM A 153/A 153M, Class B-2.
- B. Size: Sufficient to extend at least halfway, but not less than 1-1/2 inches (38 mm), through stone masonry and with at least 5/8-inch (16-mm) cover on outside face.
- C. Corrugated-Metal Veneer Anchors: Not less than 0.030-inch- (0.76-mm-) thick by 7/8-inch- (22-mm-) wide hot-dip galvanized-steel sheet with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 13 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm).
- D. Adjustable, Screw-Attached Veneer Anchors: Units consisting of a wire tie section and a metal anchor section that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Dur-O-Wal, a Dayton Superior Company
    - b. Heckmann Building Products Inc.;
    - c. Hohmann & Barnard, Inc.:
    - d. Wire-Bond:
  - 2. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).

- E. Polymer-Coated, Steel Tapping Screws for Concrete Masonry: Self-tapping screws with specially designed threads for tapping and wedging into masonry, with hex washer head and neoprene washer, 3/16-inch (4.8-mm) diameter by 1-1/2-inch (38-mm) length, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. ITW-Buildex; Tapcon.
    - b. Powers Fasteners; Tapper.
    - c. Simpson Strong-Tie; Titen Concrete and Masonry Screw

## 2.4 EMBEDDED FLASHING MATERIALS

- A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual Division 07 Section "Sheet Metal Flashing and Trim" and as follows:
  - Fabricate through-wall flashing with drip edge unless otherwise indicated.
     Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
  - 2. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch (19 mm) at exterior face of wall and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.
  - 3. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches (75 mm) into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
  - 4. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.
  - 5. Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches (75 mm) into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch (19 mm) and down into joint 3/8 inch (10 mm) to form a stop for retaining sealant backer rod.
  - 6. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.
- B. Solder and Sealants for Sheet Metal Flashings: As specified in Division 07 Section "Sheet Metal Flashing and Trim."

# 2.5 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene urethane or PVC.

- B. Cementitious Dampproofing: Cementitious formulations that are recommended by ILI and that are nonstaining to stone, compatible with joint sealants, and noncorrosive to veneer anchors and attachments.
- C. Asphalt Dampproofing: Cut-back asphalt complying with ASTM D 4479, Type I or asphalt emulsion complying with ASTM D 1227, Type III or IV.
- D. Weep Hole/Vent Products: Use one of the following unless otherwise indicated:
  - 1. Rectangular Plastic Cell Vent: Clear butyrate, 3/8 by 1-1/2 inches (10 by 38 mm) by thickness of stone masonry.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) CavClear/Archovations, Inc.; CavClear Weep Vents.
      - 2) Mortar Net USA, Ltd.; Mortar Net Weep Vents.
      - 3) Hohmann & Barnard, Inc.; #342 Rectangular Plastic Weep Holes
  - Vinyl Weep Holes/Vents: One-piece, offset, T-shaped units made from flexible, injection-molded PVC, designed to fit into head joint and consisting of louvered vertical leg, flexible wings to seal against ends of stone units, and top flap to keep mortar out of head joint; in color approved by Architect to match that of mortar.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Hohmann & Barnard, Inc.; #343 Louvered Weep Hole.
      - 2) Williams Products, Inc.; Williams-Goodco Brick Vent.
      - 3) Wire-Bond; Louvered Weepholes.
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
  - 1. Provide one of the following configurations:
    - a. Strips, full-depth of cavity and 10 inches (250 mm) wide, with dovetail shaped notches 7 inches (175 mm) deep that prevent mesh from being clogged with mortar droppings.
    - b. Strips, not less than 3/4 inch (19 mm) thick and 10 inches (250 mm) wide, with dimpled surface designed to catch mortar droppings and prevent weep holes from being clogged with mortar.
    - c. Sheets or strips full depth of cavity and installed to full height of cavity.
    - d. Sheets or strips not less than 3/4 inch (19 mm) thick and installed to full height of cavity with additional strips 4 inches (100 mm) high at weep holes and thick enough to fill entire depth of cavity and prevent weep holes from being clogged with mortar.

- 2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
  - a. Advanced Building Products Inc.
  - b. CavClear/Archovations, Inc.; CavClear Masonry Mat.
  - c. Dur-O-Wal, a Dayton Superior Company; Polytite MortarStop.
  - d. Mortar Net USA, Ltd.; Mortar Net.

#### 2.6 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar and grout stains, efflorescence, and other new construction stains from stone masonry surfaces without discoloring or damaging masonry surfaces; expressly approved for intended use by cleaner manufacturer and stone producer.
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Diedrich Technologies, Inc.
    - b. Dominion Restoration Products.
    - c. EaCo Chem, Inc.
    - d. Hydrochemical Techniques, Inc.
    - e. Prosoco, Inc.

## 2.7 MORTAR MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.
  - 1. Do not use calcium chloride.
  - 2. Limit cementitious materials in mortar to portland cement and lime.
  - 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
  - 4. Mixing Pointing Mortar: Thoroughly mix cementitious and aggregate materials together before adding water. Then mix again, adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for one to two hours. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within 30 minutes of final mixing; do not retemper or use partially hardened material.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in the form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

- C. Mortar for Stone Masonry: Comply with ASTM C 270, Property Specification.
  - 1. Mortar for Setting Stone: Type S.
  - 2. Mortar for Pointing Stone: Type N.
- D. Latex-Modified Portland Cement Setting Mortar: Proportion and mix portland cement, aggregate, and latex additive to comply with latex-additive manufacturer's written instructions.
- E. Cement-Paste Bond Coat: Mix either neat cement and water or cement, sand, and water to a consistency similar to that of thick cream.
  - 1. For latex-modified portland cement setting-bed mortar, substitute latex admixture for part or all of water, according to latex-additive manufacturer's written instructions.
- F. Mortar for Scratch Coat over Unit Masonry: 1 part portland cement, 1 part lime, 7 parts loose damp sand, and enough water to produce a workable consistency.
- G. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
  - 1. Pigments shall not exceed 10 percent of portland cement by weight.
  - 2. Pigments shall not exceed 5 percent of mortar cement by weight.

# 2.8 FABRICATION

- A. Fabricate stone to comply with sizes, shapes, and tolerances recommended by applicable stone association or, if none, by stone source, for faces, edges, beds, and backs.
  - 1. For granite, comply with recommendations in NBGQA's "Specifications for Architectural Granite."
  - 2. For limestone, comply with recommendations in ILI's "Indiana Limestone Handbook."
- B. Select stone to produce pieces of thickness, size, and shape indicated, including details on Drawings. Dress joints (bed and vertical) straight and at right angle to face unless otherwise indicated.
- C. Cut and drill sinkages and holes in stone for anchors and supports.
- D. Carefully inspect stone at quarry or fabrication plant for compliance with requirements for appearance, material, and fabrication. Replace defective units before shipment.
  - 1. Clean sawed edges of stone to remove rust stains and iron particles.

- 2. tool sawed edges of stone that are exposed to view, and create split face or natural cleft appearance. Exposed saw cuts and sawed edges shall be deemed unacceptable.
- E. Thickness of Stone: Provide thickness indicated, but not less than the following:
  - 1. Thickness: 4 inches (100 mm) plus or minus 1/2 inch (13 mm). Thickness does not include projection of pitched faces.
- F. Shape stone for type of masonry (pattern) as follows:
  - 1. Uncoursed rubble (fieldstone to match existing wall).
- G. Finish exposed faces and edges of stone to comply with requirements indicated for finish and to match approved samples and mockups.
  - 1. Finish: Mixed split face, seam face, and rock face (pitched face).
  - 2. Finish for Copings: Split faces.
    - a. Finish exposed ends of copings same as front and back faces.

## PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine surfaces indicated to receive stone masonry, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine substrate to verify that dovetail slots, inserts, reinforcement, veneer anchors, flashing, and other items installed in substrates and required for or extending into stone masonry are correctly installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 PREPARATION

- A. Coat concrete and unit masonry backup with asphalt dampproofing.
- B. Clean dirty or stained stone surfaces by removing soil, stains, and foreign materials before setting. Clean stone by thoroughly scrubbing with fiber brushes and then drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh materials or abrasives.
- 3.3 SETTING OF STONE MASONRY, GENERAL
  - A. Perform necessary field cutting and trimming as stone is set.

- 1. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
- 2. Pitch face at field-split edges as needed to match stones that are not field split.
- B. Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, or fabrication, or that is otherwise unsuitable for intended use.
- C. Arrange stones in coursed rubble pattern with joint widths within tolerances indicated. Insert small stones into spaces between larger stones as needed to produce joints as uniform in width as practical.
- D. Arrange stones with color and size variations uniformly dispersed for an evenly blended appearance.
- E. Set stone to comply with requirements indicated on Drawings. Install supports, fasteners, and other attachments indicated or necessary to secure stone masonry in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.
- F. Maintain uniform ½" joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment if any. Lay walls with joints not less than 3/8 inch (10 mm) at narrowest points or more than 5/8 inch (16 mm) at widest points.
- G. Provide sealant joints of widths and at locations indicated.
  - 1. Keep sealant joints free of mortar and other rigid materials.
  - 2. Sealing joints is specified in Division 07 Section "Joint Sealants."
- H. Install metal expansion strips in sealant joints at locations indicated. Build flanges of expansion strips into masonry by embedding in mortar between stone masonry and backup wythe. Lap each joint 4 inches (100 mm) in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints if any.
- I. Install embedded flashing and weep holes at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.
  - At concrete backing, extend flashing through stone masonry, turned up a minimum of 6 inches (150 mm), and insert in reglet. Reglets are specified Division 07 Section "Sheet Metal Flashing and Trim."
  - 2. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.
  - Install metal drip edges and sealant stops with ribbed sheet metal flashing by interlocking hemmed edges to form hooked seam. Seal seam with elastomeric sealant complying with requirements in Division 07 Section "Joint Sealants" for application indicated.

- 4. Extend sheet metal flashing 1/2 inch (13 mm) beyond face of masonry at exterior and turn flashing down to form a drip.
- 5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
- J. Coat limestone with cementitious dampproofing as follows:
  - 1. Stone at Grade: Beds, joints, and back surfaces to at least 12 inches (300 mm) above finish-grade elevations.
  - 2. Stone Extending below Grade: Beds, joints, back surfaces, and face surfaces below grade.
  - 3. Allow cementitious dampproofing formulations to cure before setting dampproofed stone. Do not damage or remove dampproofing in the course of handling and setting stone.

## 3.4 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces, do not exceed 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (10 mm in 6 m), or 1/2 inch in 40 feet (13 mm in 12 m) or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet (6 mm in 6 m) or 1/2 inch in 40 feet (13 mm in 12 m) or more.
- B. Variation of Linear Building Line: For position shown in plan, do not exceed 1/2 inch in 20 feet (13 mm in 6 m) or 3/4 inch in 40 feet (19 mm in 12 m) or more.
- C. Measure variation from level, plumb, and position shown in plan as variation of the average plane of the face of each stone from level, plumb, or dimensioned plane.
- D. Variation in Mortar-Joint Thickness: Do not vary from joint size range indicated.
- E. Variation in Plane between Adjacent Stones: Do not exceed one-half of tolerance specified for thickness of stone.

# 3.5 INSTALLATION OF ANCHORED STONE MASONRY

- A. Anchor stone masonry to concrete with corrugated-metal veneer anchors unless otherwise indicated. Secure anchors by inserting dovetailed ends into dovetail slots in concrete.
- B. Anchor stone masonry to unit masonry with corrugated-metal veneer anchors unless otherwise indicated. Embed anchors in unit masonry mortar joints or grouted cells for distance at least one-half of unit masonry thickness.

- C. Anchor stone masonry to unit masonry with wire anchors unless otherwise indicated. Connect anchors to masonry joint reinforcement with vertical rods inserted through anchors and through eyes of masonry joint reinforcement projecting from unit masonry.
- D. Anchor stone masonry to unit masonry with adjustable, screw-attached veneer anchors unless otherwise indicated. Fasten anchors to unit masonry with two screws.
- E. Embed veneer anchors in mortar joints of stone masonry at least halfway, but not less than 1-1/2 inches (38 mm), through stone masonry and with at least 5/8-inch (16-mm) cover on outside face.
- F. Space anchors to provide not less than 1 anchor per 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (300 mm) of openings, sealant joints, and perimeter at intervals not exceeding 12 inches (300 mm).
- G. Set stone in full bed of mortar with full head joints unless otherwise indicated. Build anchors into mortar joints as stone is set.
- H. Provide 1-inch (25-mm) 2-inch (50-mm) cavity between stone masonry and backup construction unless otherwise indicated. Keep cavity free of mortar droppings and debris.
  - 1. Place mortar spots in cavity at veneer anchors to maintain spacing.
  - 2. Slope beds toward cavity to minimize mortar protrusions into cavity.
  - 3. Do not attempt to trowel or remove mortar fins protruding into cavity.
- I. Rake out joints for pointing with mortar to depth of not less than 3/4 inch (19 mm) before setting mortar has hardened. Rake joints to uniform depths with square bottoms and clean sides.

#### 3.6 ADJUSTING AND CLEANING

- A. Remove and replace stone masonry of the following description:
  - 1. Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if methods and results are approved by Architect.
  - 2. Defective joints.
  - 3. Stone masonry not matching approved samples and mockups.
  - 4. Stone masonry not complying with other requirements indicated.
- B. Replace in a manner that results in stone masonry matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- C. In-Progress Cleaning: Clean stone masonry as work progresses. Remove mortar fins and smears before tooling joints.

- D. Final Cleaning: After mortar is thoroughly set and cured, clean stone masonry as follows:
  - 1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
  - 2. Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before cleaning stone masonry.
  - 3. Wet wall surfaces with water before applying cleaner; remove cleaner promptly by rinsing thoroughly with clear water.
  - 4. Clean stone masonry by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised II, using job-mixed detergent solution.

## 3.7 EXCESS MATERIALS AND WASTE

- A. Excess Stone: Stack excess stone where directed by Owner for Owner's use.
- B. Disposal as Fill Material: Dispose of clean masonry waste, including mortar and excess or soil-contaminated sand, by crushing and mixing with fill material as fill is placed.
  - 1. Crush masonry waste to less than 4 inches (100 mm) in greatest dimension.
  - 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste. Fill material is specified in Division 31 Section "Earth Moving."
  - 3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- C. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other waste, and legally dispose of off Owner's property.

END OF SECTION 04 43 00

## PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the cast stone as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Cast stone copings built into masonry walls.
  - 2. Mortar.
  - 3. Anchors and accessories.

4. Joint filler.

## 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Joint Sealers Section 079200.

#### 1.4 QUALITY ASSURANCE

- A. Qualifications of Workmen
  - For the actual cutting and placing of cast stone units, use only skilled journeyman masons
    who are thoroughly experienced with the materials and methods specified and thoroughly
    familiar with the design requirements.
  - 2. In acceptance or rejection of installed cast stone units, no allowance will be made for lack of skill on the part of workmen.
- B. Manufacturer shall have a minimum of ten (10) years' experience in the manufacture of cast stone. Manufacturer's products must have previously been used on the exterior with satisfactory results. Manufacturer must have capability to produce cast stone on schedule and must be a member of the Cast Stone Institute.
- C. Casting Tolerances: Maintain casting, bowing, warping and dimension tolerance within the following maximums:
  - 1. Overall Dimension For Height and Width of Units: Plus zero of unit dimension to minus 3/32" for 10'-0" and over.
  - 2. Twist, Bowing or Warping: Do not exceed length/360 or 1/8", whichever is greater.
  - 3. Insert Locations: Place within plus or minus 1/8" in each direction.
  - 4. Length of units shall not deviate by more than +/- 1/8" from approved dimensions.
- D. Reference Standards: Comply with applicable provisions and recommendations of the following, except as otherwise shown or specified.

ASTM C 1364 Standard Specification for Architectural Cast Stone except

١.	A01W C 1304	where more stringent standards are specified herein.
2.	ASTM C 150	Specification for Portland Cement.
3.	ASTM C 33	Specification for Concrete Aggregates.
4.	ASTM C 979	Specification for Coloring Pigments for Integrally Pigmented Concrete.

Specification for Concrete Admixtures.

5. ASTM C 494

6.	ASTM A 615	Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement.
7.	ASTM C 1194	Test Method for Compressive Strength of Architectural Cast Stone.
8.	ASTM C 1195	Test Method for Absorption of Architectural Cast Stone.
9.	ASTM C 642	Test Method for Specific Gravity, Absorption, and Voids in Hardened Concrete.
10.	ASTM C 39	Test Method for Compressive Strength of Concrete Cylinders.
11.	ASTM D 2244	Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

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- E. Testing: Test three specimens per 500 cubic feet at random from plant production in accordance with referenced standards.
- F. Cold weather setting practices shall conform to the requirements specified in Section 042000.

## 1.5 SUBMITTALS

- A. Submit samples of cast stone with documented independent testing laboratory reports to the Architect for approval.
- B. Samples: Before any cast stone materials are delivered to the job site, submit twelve (12) inch long samples of each profile type cast stone unit required.
  - 1. Submit 6" x 6" cast stone samples showing full range of colors and texture available.
- C. Shop Drawings: Submit complete shop drawings of all cast stonework showing anchorage, type, location and spacing, joint fillers, mortar, and cast stone profiles, sizes, connections, location, type and size of reinforcing and adjacent construction.
  - 1. The shop drawings shall show the setting mark of each stone and its location on the structure. The stone when delivered shall bear the same corresponding setting mark on an unexposed surface.
  - 2. Shop drawings must show exact profiles for each piece.
- D. Certification: Submit certification from an independent testing laboratory certifying to test results required under Article 1.4, Para. E. herein.

#### 1.6 PRODUCT HANDLING

A. Protection: Use all means necessary to protect cast stone and related materials before, during, and after installation, and to protect the installed work and materials of all other trades.

- 1. Stone shall be stored on skids, off the ground and covered with plastic sheeting; all material in contact with stone shall be non-staining.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

#### PART 2 PRODUCTS

#### 2.1 CAST STONE

- A. The Cast Stone used in this work shall match color and texture of samples approved by the Architect. The samples shall be approved by the Architect prior to fabrication of cast stone.
- B. Exposed surfaces, unless otherwise specified, shall exhibit a typically fine grained texture similar to natural stone. No bug holes will be permitted and all facing material shall be mixed in a muller mixer.
- C. Cast Stone used in this work shall conform to the following properties:
  - 1. Compressive Strength, ASTM C 1194: 6500 psi min. for products at 28 days.
  - 2. Absorption, ASTM C 1195 or ASTM C 642: 6% max. for products at 28 days.
  - Cumulative Percent Weight Loss (CPWL) shall be less than 5% after 300 freeze/thaw cycles when tested in accordance with ASTM C 1364.
  - 4. Air Content: ASTM C 173 or C 231, for wet cast product only shall be 4-8%. Air entrainment is not required for dry cast products.
  - 5. Linear Shrinkage: ASTM C 426: Shrinkage shall not exceed 0.065%.
  - 6. Color Variation
    - a. Must match color and finish of approved sample when viewed in direct daylight at a 5 foot distance.
    - b. ASTM Color Variation Allowed: 2% hue; 6% lightness, chrome and hue combined.

## 2.2 MATERIALS

- A. Cement shall be Portland Type I white, meeting ASTM C 150.
- B. Fine aggregate shall be carefully graded and washed natural sands, or manufactured granite, marble, quartz or limestone sands meeting ASTM C 33, except that gradation may vary to achieve desired finish and texture.
- C. Coarse aggregate shall be carefully graded and washed natural gravel, or crushed graded stone such as granite, marble quartz, limestone or other durable stone meeting ASTM C 33, except that gradation may vary to achieve desired finish and texture.

- D. Coloring: All colors added shall be inorganic (natural or synthetic) iron oxide pigments meeting ASTM C 979 excluding the use of a cement grade of carbon black pigment, and shall be guaranteed by the manufacturer to be light fast and lime proof. The amount of pigment shall not exceed ten (10) percent by weight of the cement used. Colorant shall be manufactured by Davis Colors, Solomon Colors, Spec Mix.
- E. Cast stone shall be reinforced with new billet steel reinforcing bars meeting ASTM A 615, grade 60, when necessary for safe handling, setting and structural stress, and the size of the reinforcing shall be as shown on approved shop drawings. If the surfaces are to be exposed to the weather, the reinforcement shall be galvanized or epoxy coated when covered with less than two (2) inches of material for bars larger than 5/8 inch and 1-1/2 inches for bars 5/8 inch or smaller. The material covering in all cases shall be at least twice the diameter of the bars. Stone shall be fully reinforced to take all stresses including handling, temperature changes and structural stress.
- F. All anchors, dowels and other anchoring devices shall be furnished by the stone setter as shown on approved shop drawings using building stone anchors fabricated of Stainless Steel Type 304.
  - Anchors shall allow for wracking of the structure (seismic) without stressing the cast stone units.

## 2.3 FABRICATION

- A. Cast stone, after being made, shall be cured as noted below in Article 2.5.
- B. Cast stone shall be "dry cast" or "wet cast" (depending upon selected finish) to produce sharp arrises to match profiles on approved shop drawings. Provide stone with sinkages to receive anchors.
- C. Cast stone for copings shall be fabricated to largest practical length, as shown on approved shop drawings.
- D. Acid etch exposed surfaces as required to remove cement film prior to packaging and shipment. Sandblasting or chemical retardation finishing is not permitted.

## 2.4 CURING

A. Cure units in a warm curing chamber approximately 100 deg. F. at 95% relative humidity for approximately 12 hours, or cure in a 95% moist environment at a minimum 70 deg. F. for 16 hours after casting. Additional yard curing at 95% relative humidity shall be 350 degree days (i.e. 7 days at 50 deg. F. or 5 days at 70 deg. F. prior to shipping. Form cured units shall be protected from moisture evaporation with curing blankets or curing compounds after casting.

# 2.5 ACCESSORIES

A. Mortar for setting of cast stone sections shall conform to ASTM C 270, Type N, with not more than 1/2 part lime per part of white non-staining Portland cement with integral colorant as required to match color of stone.

B. Joint Filler: Fill all joints with exposed tops with "Emseal" Greyflex Expanding Foam Sealant as manufactured by Emseal, Inc., "Sealtite" by Schul International, "Polytite" by Polytite. Material shall be designed for compression in joint twenty-five (25) percent of its original width, depth of filler as per manufacturer's standard. Joint filler shall be recessed 3/4" from finished surface.

#### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where cast stone is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION

A. Carefully coordinate with all other trades to ensure proper and adequate interface of the work of other trades with the work of this Section.

## 3.3 JOINTING

- A. Joint Size: 3/8", unless otherwise noted.
- B. Joint Material
  - 1. Use a full bed of mortar at all bed joints.
  - 2. Flush vertical joints full with mortar.
  - 3. Leave all joints with exposed tops open for sealant.
- C. Location of Joints: As shown on approved shop drawings.

#### 3.4 SETTING

- A. All cast stone shall be set by experienced stone masons, accurately and in accordance with the shop and setting drawings. All anchors and dowels shall be firmly placed and all anchor holes and dowel holes and similar holes filled completely with mortar. Cast stone anchors shall be fastened only to concrete, fully grouted CMU, or cold formed metal framing, using anchors appropriate for each substrate.
- B. Setting Tolerances: Plus/minus 1/32" allowable out of plane with adjacent units.
- C. When setting with mortar, all stones not thoroughly wet shall be drenched with clear water just prior to setting.
- D. All stone shall be protected from splashing mortar or damage by other trades. Any foreign matter splashed on the stone shall be removed immediately.

E. All joints with exposed tops shall be filled with joint filler specified herein recessed 3/4" from stone surface; balance of joint shall be filled with back-up rod and sealant by Section 079200.

#### 3.5 PATCHING

- A. The repair of chipped or damaged cast stone shall be done only by mechanics skilled in this class of work, with materials furnished by the manufacturer and according to his direction.
- B. Patching will not be permitted on copings and any other piece which can be removed and replaced without undue difficulty. Replace such pieces which are chipped or damaged with identical new pieces. Reseal and/or repoint to remove any evidence of replacement.
- C. Cast stone shall show no obvious repairs or imperfections other than minimal color variations when viewed with the unaided eye under good typical lighting at a ten (10) foot distance.

## 3.6 CLEANING

A. Before pointing, the face of all cast stone shall be scrubbed with a fiber brush, using soap powder and water and shall then be rinsed thoroughly with clean running water. Any mortar on the face of the cast stone shall be removed. No acids or prepared cleaners shall be used without the approval of the cast stone manufacturer.

## 3.7 POINTING

A. When ready for tuck pointing, the mortar joints shall be dampened and raked back 3/4" for pointing. Pointing shall form a slight concave profile. No pointing shall be done in freezing weather nor in locations exposed to hot sun unless properly protected. Pointing mortar shall be composed of one (1) part non-staining cement (ASTM C 91), one (1) part hydrate lime (ASTM C 207, Type S) and four (4) parts of clean, washed sand (ASTM C 144). Coloring pigments shall be added as specified in Section 042000 for face brick construction. The Architect shall approve color of pointing mortar before proceeding with pointing.

# 3.8 PROTECTION

A. All projecting cast stone pieces shall be fully protected when installed against damage of any kind. Any piece damaged shall be replaced at no additional cost.

# 3.9 INSPECTION AND ADJUSTMENT

A. Upon completion of the work, make a thorough inspection of all installed cast stone and verify that all units and joints have been installed in accordance with the provisions of this Section; make all necessary adjustments.

**END OF SECTION** 



## PART 1 - GENERAL

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

#### A. Section Includes:

- 1. Structural steel.
- 2. Grout.
- 3. Components of this section are part of Supplemental Bid no. 2. See Section 012313 Supplemental Bids.

## B. Related Sections:

- 1. 012313 Supplemental Bids
- 2. 017419 Construction Waste Management & Disposal
- 3. 018113 Sustainable Design Requirements
- 4. Division 01 Section "Quality Control" for independent testing agency procedures and administrative requirements.
- 5. Division 05 Section "Steel Decking" for field installation of shear connectors through deck.
- 6. Division 05 Section "Miscellaneous Metals" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, metal stairs, and other metal items not defined as structural steel.
- 7. Division 09 painting Sections for surface-preparation and priming requirements.

## 1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

- B. Seismic-Load-Resisting System: Elements of structural-steel frame designated as "SLRS" or along grid lines designated as "SLRS" on Drawings, including columns, beams, and braces and their connections.
- C. Heavy Sections: Rolled and built-up sections as follows:
  - 1. Shapes included in ASTM A 6/A 6M with flanges thicker than 1-1/2 inches (38 mm).
  - 2. Welded built-up members with plates thicker than 2 inches (50 mm).
  - 3. Column base plates thicker than 2 inches (50 mm).

### 1.4 PERFORMANCE REQUIREMENTS

- A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator, including comprehensive engineering design by a qualified professional engineer, to withstand loads indicated and comply with other information and restrictions indicated.
  - 1. Select and complete connections using schematic details indicated and AISC 360.
  - 2. Use ASD; data are given at service-load level.
- B. Moment Connections: Type FR, fully restrained.
- C. Construction: Combined system of moment frame and braced frame.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated.
- C. Shop Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment drawings.
  - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pre-tensioned and slip-critical high-strength bolted connections.
  - 5. Identify members and connections of the seismic-load-resisting system.
  - 6. Indicate locations and dimensions of protected zones.
  - 7. Identify demand critical welds.

- 8. For structural-steel connections indicated to comply with design loads, include structural design data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether pre-qualified or qualified by testing, including the following:
  - 1. Power source (constant current or constant voltage).
  - 2. Electrode manufacturer and trade name, for demand critical welds.
- E. Qualification Data: For qualified Installer, fabricator, and professional engineer.
- F. Welding certificates.
- G. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- H. Mill test reports for structural steel, including chemical and physical properties.
- I. Product Test Reports: For the following:
  - 1. Revise list below to suit Project. Insert alternative design bolts if required.
  - 2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
  - Direct-tension indicators.
  - 4. Tension-control, high-strength bolt-nut-washer assemblies.
  - 5. Shear stud connectors.
  - 6. Shop primers.
  - 7. Non-shrink grout.
- J. Source quality-control reports.

### 1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.
- B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector.
- C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P3 or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."
- D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code Steel."

- Welders and welding operators performing work on bottom-flange, demandcritical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.
- E. Comply with applicable provisions of the following specifications and documents:
  - 1. AISC 303.
  - 2. AISC 341 and AISC 341s1.
  - 3. AISC 360.
  - 4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
  - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
  - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
  - 2. Clean and re-lubricate bolts and nuts that become dry or rusty before use.
  - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

## 1.8 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

#### PART 2 - PRODUCTS

#### 2.1 STRUCTURAL-STEEL MATERIALS

- A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of preconsumer recycled content is not less than 50 percent.
- B. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so post-consumer recycled content plus one-half of preconsumer recycled content is not less than the following:
  - 1. W-Shapes: 60 percent.
  - 2. Channels, Angles: 60 percent.
  - 3. Plate and Bar: 25 percent.
  - 4. Cold-Formed Hollow Structural Sections: 25 percent.
  - 5. Steel Pipe: 25 percent.
  - 6. All Other Steel Materials: 25 percent.
- C. W-Shapes: ASTM A 992/A 992M.
- D. Channels, Angles: ASTM A 36/A 36M.
- E. Plate and Bar: ASTM A 36/A 36M.
- F. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- G. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
  - 1. Weight Class: Standard or Extra strong per contract document.
  - 2. Finish: Black except where indicated to be galvanized.
- H. Steel Castings: ASTM A 216/A 216M, Grade WCB with supplementary requirement S11.
- I. Steel Forgings: ASTM A 668/A 668M.
- J. Welding Electrodes: Comply with AWS requirements.

## 2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade C, (ASTM A 563M, Class 8S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers; all with plain finish.

- 1. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with plain finish.
- B. High-Strength Bolts, Nuts, and Washers: ASTM A 490 (ASTM A 490M), Type 1, heavy-hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563, Grade DH, (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers with plain finish.
  - 1. Direct-Tension Indicators: ASTM F 959, Type 490 (ASTM F 959M, Type 10.9), compressible-washer type with plain finish.
- C. Zinc-Coated High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563, Grade DH (ASTM A 563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M), Type 1, hardened carbon-steel washers.
  - 1. Finish: Mechanically deposited zinc coating.
  - 2. Direct-Tension Indicators: ASTM F 959, Type 325 (ASTM F 959M, Type 8.8), compressible-washer type with mechanically deposited zinc coating finish.
- D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, round head assemblies consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.
  - 1. Finish: Mechanically deposited zinc coating.
- E. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.
- F. Unheaded Anchor Rods: ASTM F 1554, Grade as shown on plan, weldable.
  - 1. Configuration: Hooked.
  - 2. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
  - 3. Plate Washers: ASTM A 36/A 36M carbon steel.
  - 4. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
  - 5. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.
- G. Headed Anchor Rods: ASTM F 1554, Grade as shown on plan, weldable, straight.
  - 1. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
  - 2. Plate Washers: ASTM A 36/A 36M carbon steel.
  - 3. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
  - 4. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.
- H. Threaded Rods: A 572/A 572M, Grade 50 (345).
  - 1. Nuts: ASTM A 563 (ASTM A 563M) [heavy-]hex carbon steel.

- 2. Washers: ASTM F 436 (ASTM F 436M), Type 1, hardened carbon steel.
- 3. Finish: Mechanically deposited zinc coating, ASTM B 695, Class 50.
- I. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.
- J. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.
- K. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.
- L. Structural Slide Bearings: Low-friction assemblies, of configuration indicated, that provide vertical transfer of loads and allow horizontal movement perpendicular to plane of expansion joint while resisting movement within plane of expansion joint.
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    - a. Fluorocarbon Company Limited.
  - 2. Mating Surfaces: PTFE and mirror-finished stainless steel.
  - 3. Coefficient of Friction: Not more than 0.05.
  - 4. Design Load: Not less than 5,000 psi (34 MPa).
  - 5. Total Movement Capability: 2 inches (50 mm).

#### 2.3 PRIMER

- A. Primer for exposed steel members: SSPC-Paint 25, Type I, zinc oxide, alkyd, linseed oil primer.
- B. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- C. Galvanizing Repair Paint: SSPC-Paint 20.

## 2.4 GROUT

- A. Metallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30minute working time.
- B. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

### 2.5 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.
  - 1. Camber structural-steel members where indicated.
  - 2. Fabricate beams with rolling camber up.
  - 3. Identify high-strength structural steel according to ASTM A 6/A 6M and maintain markings until structural steel has been erected.
  - 4. Mark and match-mark materials for field assembly.
  - 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."
- F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.
- G. Steel Wall-Opening Framing: Select true and straight members for fabricating steel wall-opening framing to be attached to structural steel. Straighten as required to provide uniform, square, and true members in completed wall framing.
- H. Welded Door Frames: Build up welded door frames attached to structural steel. Weld exposed joints continuously and grind smooth. Plug-weld fixed steel bar stops to frames. Secure removable stops to frames with countersunk machine screws, uniformly spaced not more than 10 inches (250 mm) o.c. unless otherwise indicated.
- I. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.
  - 1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
  - 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

#### 2.6 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened, Pre-tensioned, and Slip critical per contract documents.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

## 2.7 SHOP PRIMING

- A. Shop prime steel surfaces except the following:
  - 1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
  - 2. Surfaces to be field welded.
  - 3. Surfaces to be high-strength bolted with slip-critical connections.
  - 4. Surfaces to receive sprayed fire-resistive materials (applied fire-proofing).
  - Galvanized surfaces.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:
  - 1. SSPC-SP 3, "Power Tool Cleaning."
- C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
  - 2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Prepare steel and apply a one-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

### 2.8 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.
  - 1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
  - 2. Galvanize lintels, shelf angles, and steel elements exposed to weather, attached to structural-steel frame and located in exterior walls.

### 2.9 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
  - 1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
  - 1. Liquid Penetrant Inspection: ASTM E 165.
  - 2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
  - 3. Ultrasonic Inspection: ASTM E 164.
  - 4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
  - 1. Bend tests will be performed if visual inspections reveal either a less-thancontinuous 360-degree flash or welding repairs to any shear connector.
  - Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
  - 1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.
  - 1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

## 3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.
- B. Base Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
  - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
  - 2. Weld plate washers to top of base plate.
  - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
  - 4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
  - 1. Level and plumb individual members of structure.
  - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Architect. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

#### 3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
  - 1. Joint Type: Snug tightened, Pre-tensioned, and Slip critical per contract documents.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
  - 1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
  - 2. Remove backing bars or runoff tabs where indicated, back gouge, and grind steel smooth.
  - 3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

### 3.5 FIELD QUALITY CONTROL

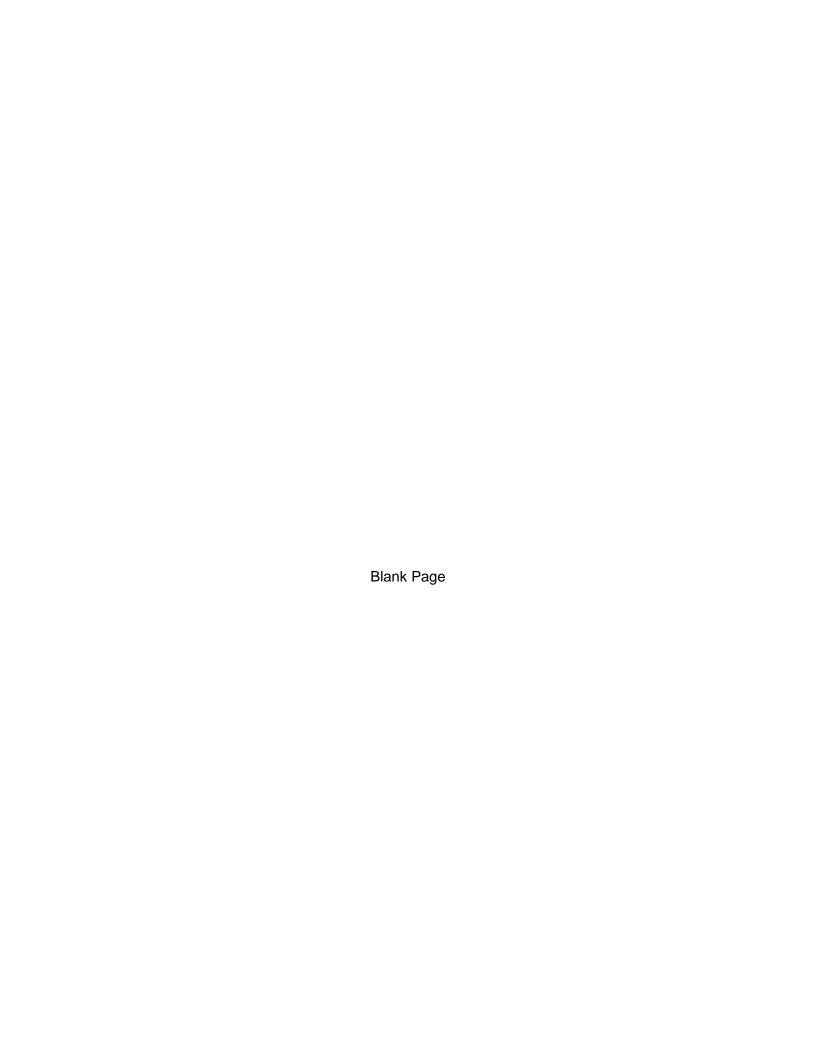
A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

- B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- C. Welded Connections: Field welds will be visually inspected according to AWS D1.1/D1.1M.
  - In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    - c. Ultrasonic Inspection: ASTM E 164.
    - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1/D1.1M for stud welding and as follows:
  - 1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
  - 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1/D1.1M.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

### 3.6 REPAIRS AND PROTECTION

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.
- B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
  - 1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

END OF SECTION 05 12 00



### PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. Architecturally-exposed structural steel (AESS).

## 1.3 RELATED SECTIONS

A. Structural Steel - Section 051200.

B. Finish field painting - Section 099000.

## 1.4 QUALITY ASSURANCE

A. General: Work of this section shall be fabricated and installed by an experienced fabricator or manufacturer, who has been engaged in work of equivalent scope and fabrication standards for at least five years. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, and erection shall be in accordance with drawings, specifications, and approved shop drawings, and be of highest quality practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled, and erected.

## 1.5 STANDARDS

- A. Except where more stringent requirements are specified herein, comply with the applicable provisions and recommendations of the following (latest edition):
  - 1. AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings."
  - 2. AISC "Architecturally Exposed Structural Steel."
  - 3. AISC "Specifications for Structural Joints Using ASTM A325 or A490 Bolts."
  - 4. AWS D1.1 "Structural Welding Code."
  - 5. SSPC "Steel Structures Painting Manual, Volume 2, Systems and Specifications."
  - 6. ANSI/AWS A533-9X, Specification for Alloy Wires, Cored Wire and Ceramic Rods for Thermal Spraying, American Welding Society.
  - 7. ANSI/AWS C2.18.93, Guide for the Protection of Steel with Thermal Spraying Coating of Aluminum and Zinc, American Welding Society.
  - 8. ASTM C633, Standard Test Method for Adhesion or Cohesive Strength for Flame Sprayed Coatings, American Society for Testing and Materials.
  - 9. SSPC-CS Guide 23.00, June 1, 1991, Coating System Guide for Thermal Spray Metallic Coating Systems, Steel Structures Painting Council.

### 1.6 SUBMITTALS

- A. Product Data: For recycled content, indicating post-consumer and pre-consumer recycled content and cost.
- B. Product Certificates: For regional content, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost.

- C. Product Data: For field-applied repair paints, indicating VOC content.
- D. Shop Drawings: Submit shop and erection drawings for all structural steel components showing the following:
  - 1. Types of materials, including sizes and weights of members.
  - 2. Location, types and details of connections.
  - 3. Welding sequences as required by "Structural Welding Code."
  - 4. Cleaning and painting schedules.
  - 5. Fabrication and erection procedure where needed to control shrinkage, fabrication tolerances or to insure proper inspection.

### E. Reports

- Submit certified copies of mill test reports for all steel furnished. Perform mechanical and chemical tests for all material regardless of thickness or use. No part of the ASTM Specifications will be waived without written consent of the Architect.
- 2. Submit copies of prequalified and other welding procedures in form prescribed in "Structural Welding Code."
- F. Samples: Submit samples of each:
  - Typical welded connection.
  - 2. Typical nut and bolt connection.
  - 3. Paint sample painted on welded steel components.
- G. Submit structural calculations and details signed and sealed by a professional engineer licensed in the State of Massachusetts, show fabrication, sizes of members, connections and anchorage. Where member sizes very from those shown on drawings due to structural requirements, coordinate with the Architect before fabrication.

#### 1.7 PRODUCT HANDLING

- A. Conform to delivery, storage and handling requirements specified in Section 051200.
- B. Do not handle structural steel until paint has thoroughly dried. Care shall be exercised to avoid abrasions and other damage. Provide all necessary cradles, dunnage, padding or other protection as required during storage and transportation. Wherever possible, handle primed steel with non-marring slings or by means of shackles inserted into connection holes.

C. Stack material out of mud and dirt and provide for proper drainage. Protect shop painted steel from damage or soiling by adjacent construction operations.

#### PART 2 PRODUCTS

## 2.1 MATERIALS

A. Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Surfaces exposed to view that exhibit pitting, seam marks, roller marks, oil-canning, stains, discolorations, or other imperfections on the finished units will not be acceptable.

### B. Structural Steel

- 1. ASTM A 572 Grade 50 for wide flange shape.
- 2. ASTM A 500 Grade A for square, round or rectangular shape.
- 3. ASTM A 36 for all other steel.
- C. High Strength Bolts and Nuts: ASTM A 325 and ASTM A 490, minimum 3/4" diameter.
- D. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.
- E. Anchors and Inserts: Either furnish inserts to be set in concrete or masonry work, or provide other anchoring devices as required for the installation of ornamental metal items. Provide toothed steel or lead shield expansion bolt devices for drilled-in-place anchors. Provide galvanized or cadmium-coated anchors and inserts for exterior installations.
  - 1. Provide units with exposed surfaces matching the texture and finish of the metal item anchored.

## 2.2 FABRICATION

A. Cutting: Cut metal by sawing, shearing or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp, square and free of burrs, without deforming adjacent surfaces or metals.

## B. Connections

 Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water. Locate joints where indicated on approved shop drawings. Provide connections to allow for thermal movement of metal at locations and by methods approved by Architect. Use welded connections throughout, except where mechanical fasteners are permitted

- on approved shop drawings. Where mechanical fasteners are used, joints shall be accurately fitted, flush and rigidly secured with hairline contacts.
- Welding: Welding shall be in accordance with recommendations of the American Welding Society and shall be done with electrodes and/or methods recommended by the manufacturers of the metals being welded. Welds shall be continuous, except where spot welding is specifically permitted on approved shop drawings. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces so that joint will not be visible; undercut metal edges where welds are required to be ground flush and dressed smooth. All welds on or behind surfaces which will be exposed to view shall be done so that finished surface will be free of imperfections such as pits, runs, splatter, cracks, warping, dimpling, depressions or other forms of distortion or discoloration. Remove weld spatter and welding oxides from all welded surfaces. Sample of welding must be available for Architect's approval.
  - a. All welds shall be made in accordance with the Building Code and with AWS D1.1-62 "Structural Welding Code." All welds shall satisfy structural requirements and shall also satisfy architectural requirements, as specified herein, where exposed to view. Welders shall be qualified by tests per AWS D1.1.
  - b. Welded connections shall be made without causing bends, twists or exposed open joints in the finished members.
  - c. All welds shall be continuous from end-to-end of the piece; there shall be no open joints. All exposed fillet welds shall be of the same dimension (5/16" min.) for all built-up members. Dimension of exposed fillet welds shall meet structural requirements and appearance shall be as approved by Architect.
  - d. All welds shall be finished in accordance with finish requirements specified herein. Welds not exposed to view shall have "as-welded" surface in conformance with AWS D1.1-72 "Structural Welding Code."

# 3. Bolting

- a. Bolts shall be of a length that will extend not less than 1/4 in. but not more than 1/2 in. beyond the nuts. Enter bolts into holes without damaging the thread.
- b. Use high-strength bolts in bearing and/or friction as shown. Make high-strength bolted joints without the use of erection bolts. Bring members tightly together with sufficient high-strength fitting-up bolts which shall be retightened as all the bolts are finally tightened. Manual torque wrenches will not be accepted for final tightening. Protect bolt heads from damage during placing. Bolts that have been completely tightened shall be marked for identification.
- c. Final tightening of high-strength bolts shall be by properly calibrated wrenches unless turn-of-nut method is specifically permitted. Each wrench shall be checked for accuracy at least once daily.

- d. Draw unfinished bolt heads and nuts tight against the work with a suitable wrench not less than 15 in. long. Mutilate bolt threads for unfinished bolts to prevent the nuts from backing off.
- C. Mill column and bearing stiffeners to give full bearing over the cross section. Mill contact surfaces of bearing and base plate. It is not necessary to plane bottom surfaces of plates on grout beds.
- D. Drill or punch holes at right angles to the surface of the metal, not more than 1/16" larger than the connector diameter. Do not make or enlarge holes by burning. Drill material having a thickness in excess of the connector diameter and material thicker than 7/8". Holes shall be clean-cut without torn or ragged edges. Remove outside burrs resulting from drilling operations.
- E. Provide holes in members to permit connection of the work of other trades. Use suitable templates for proper location of these holes. Steel requiring adjustment shall be provided with slotted holes as shown.
- F. Provide holes, slots and openings required by other trades together with necessary reinforcing as shown. Use suitable templates for proper location of these openings. Where openings are shown on the shop drawings no change in location will be permitted without prior approval.
- G. The use of controlled heat straightening, curving, warping, twist or cambering is permitted. All work shall be performed in a first-class manner in accordance with the requirements of Art. 3.7.3 of AWS D1.1.
- H. Fill dents with metallic filler and grind flush and smooth. Grind abrasions and other defects where finished appearance will be affected.
- I. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items for architectural metal work to be built into concrete, masonry, or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- J. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- K. Exposed Work: In addition to requirements specified herein or shown on drawings, all surfaces exposed to view shall be clean, and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs and other defects which mar appearance of finished work. Ornamental metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.

- L. Materials used shall be of such strength, thickness and alloy that they are capable of meeting all standards and descriptions specified herein and as detailed on drawings.
- M. Special attention shall be given to steel requiring accurate alignment. Provide slotted holes for typical connections and sufficient length of threaded portion of rods as required.

## 2.3 TOLERANCES

- A. Fabrication tolerances shall be as follows:
  - Rolled Shapes: Permissible tolerances for out-of-square or out-of-parallel depth, width and symmetry of rolled shapes shall be as specified in ASTM A 6. Match abutting cross-sectional configurations. The as-fabricated straightness tolerances of members shall be one-half of the standard camber and sweep tolerances in ASTM A 6.
  - 2. Built-Up Members: The tolerances on overall profile dimensions of members made up from a series of plates, bars and shapes by welding are limited to the accumulation of permissible tolerances of the component parts as provided by ASTM Specification A6. The as-fabricated straightness tolerances for the member as a whole shall be one-half the standard camber and sweep tolerances for rolled shapes in ASTM A6.
  - 3. Weld Show-Through: It is recognized that the degree of weld show-through, which is any visual indication of the presence of a weld or welds on the side away from the viewer, is a function of weld size and material thickness. The members or components will be acceptable as produced for non-visible conditions, welds exposed to view shall have no show-through.
  - 4. Joints: All copes, miters and butt cuts in surfaces exposed to view shall be closed, no open joints permitted.
- B. Erection Tolerances: Members and components shall be plumbed, leveled and aligned to a tolerance not to exceed one-half the amount permitted for structural steel. Provide adjustable connections between AESS and the structural steel frame or the masonry or concrete supports, in order to provide means for adjustment.

## 2.4 SHOP FINISHING OF STEEL

- A. Finishing of Architectural Structural steel shall be as follows:
  - 1. Surface Prep: SSPC-SP-10 Near White Metal Blasting, with 3-4 mil anchor pattern.
  - 2. First coat Zinc/Aluminum metallizing at 4-6 mils dft.
  - 3. Second Coat: Epoxy sealer V27 FC Typoxy or N69 Epoxoline II at 3-5 mils dft by Tnemec.

- 4. Third Coat: Field applied urethane topcoat, see Section 099000.
- B. Zinc for aluminum metallizing material shall consist of 85% zinc, 15% aluminum wire meeting standard noted herein.
- C. The system shall meet or exceed the following:
  - Adhesion of Zinc/aluminum Metallizing: An average of 1,5000 psi, per ASTM D 4541.
  - 2. Adhesion of Epoxy Sealer Over Zinc/Aluminum Metallizing: A rating of 5 out of 5 per ASTM d 3359 after system had been exposed to 10 freeze thaw cycles (1 cycle = 4 hours 100% humidity, 16 hours in freezer, 4 hours in 140 degree oven).
  - 3. Corrosion Resistance of Zinc/Aluminum Metallizing: 0% rust at scribe after 16 months exterior exposure.
    - a. A rating of 10 out of 10 (no rusting at scribe) after 4 years natural exposure.
  - 4. Corrosion Resistance of Zinc/Aluminum Metallizing with 1 coat epoxy sealer and 1 coat of urethane topcoat (see Section 099000.
    - a. A rating of 10 out of 10 (no rusting at scribe) after 1500 hours salt fog (Prohesion Method) ASTM D-1654.

#### PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where architecturally-exposed structural steel is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 ERECTION

- A. Erection shall be in accordance with Section 10.5 Code of Standard Practice for Steel Building and Bridges.
- B. Check the alignment and elevations of all column supports and location of all anchor bolts with transit and level instruments before starting erection. Notify Architect of any errors. Obtain Architect's approval of methods proposed for correcting errors prior to proceeding with corrections and erection.
- C. Drift Pins may be used only to align the several parts. They shall not be used in such manner as to distort or damage the metal.
- D. Field oxygen cutting of structural steel for fitting-up purposes shall not be allowed.

E. Make all necessary provisions for temporary bracing and for completion of erection.

## 3.3 CONNECTIONS

- A. Connections shall comply with requirements specified in Part 2 Products.
- B. No field splices shall be allowed.

#### 3.4 FIELD PAINTING

A. After erection, clean exposed surfaces and repair damaged shop paint with the same primer used in the shop coat.

#### 3.5 TOLERANCES

- A. Individual pieces shall be plumbed, leveled and aligned in accordance with the requirements specified herein.
- B. Dimensions shown on Drawings are based on an assumed design temperature of 70 degrees F. Fabrication and erection procedures shall take into account the ambient temperature range at the time of the respective operations.

## 3.6 FIELD AND SHOP QUALITY CONTROL

- A. Testing and inspection of structural steel will be performed by a testing agency retained by the Owner. Provide the testing agency with the following:
  - 1. A complete set of accepted documents required under Paragraph "Submittals."
  - 2. Cutting lists, order sheets, material bills, and shipping bills.
  - 3. Information as to time and place of all rollings and shipment of material top shops.
  - 4. Representative sample pieces as requested by the testing agency.
  - 5. Full and ample means and assistance for testing all material.
  - 6. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the mills, shop and filed.
- B. Each person installing connections shall be assigned an identifying symbol or mark and all shop and field connections shall be so identified so that the Inspector can refer back to the person making the connection. Welders must be AWS; copies of such shall be provided to the Testing Agency.
- C. The Inspector will perform his duties, when possible, in such a way that fabrication and erection are not unnecessarily delayed or impeded, and as follows:

- The Inspector shall make all tests and inspections as required by prevailing Codes and Ordinances. The Inspector shall make all the tests and inspections as may be indicated on the Structural Drawings.
- 2. The Inspector will make all tests and inspections as required by "Structural Welding Code."
- The technique for radiographic inspection will be in accordance with Section 6, Part B of the "Structural Welding Code." A double film technique will be used. One copy of each film will be sent to the Architect, the other will be retained by the Inspector.
- 4. Ultrasonic inspection will be performed in accordance with Section 6, Part C of the "Structural Welding Code."
- 5. Shop welds will be inspected in the shop before the work is painted or approved for shipment.
- The Inspector will make all tests and inspections of high strength bolt connections as required by AISC "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts."
- 7. Where inspection reveals defects, the extent of inspection will be increased as much as necessary to assure that the full extent of the defects in a joint has been found and to assure that the same defects are not present on similar parts or under similar circumstances.
- 8. Work that is not acceptable will be designated by "Repair" or "Reject," as applicable.
- The Inspector will maintain a daily record of the work he has inspected and its disposition. One copy of each of the reports will be submitted to the Architect on a weekly basis.
  - a. Welding reports of tests will be made in form prescribed in the "Structural Welding Code."

**END OF SECTION** 

## PART 1 - GENERAL

# 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

### A. Section Includes:

- Roof deck.
- 2. Composite floor deck.
- 3. Noncomposite form deck.

## B. Related Requirements:

- 1. 017419 Construction and Demolition Waste Management
- 2. 018113 VOC Limits for Adhesives, Sealants, Paints and Coatings
- 3. 018119 Construction Indoor Air Quality (IAQ) Management
- 4. Division 03 Section "Cast-in-Place Concrete" for normal-weight and lightweight structural concrete fill over steel deck.
- 5. Division 05 Section "Structural Steel Framing" for shop- and field-welded shear connectors.
- 6. Division 05 Section "Metal Fabrications" for framing deck openings with miscellaneous steel shapes.
- 7. Division 09 painting Sections for repair painting of primed deck and finish painting of deck.

#### 1.3 SUBMITTALS

A. Product Data: For each type of deck, accessory, and product indicated.

## B. Shop Drawings:

 Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

## 1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

- B. Product Certificates: For each type of steel deck.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that each of the following complies with requirements:
  - 1. Power-actuated mechanical fasteners.
  - 2. Acoustical roof deck.
- D. Evaluation Reports: For steel deck.
- E. Field quality-control reports.

#### 1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.3, "Structural Welding Code Sheet Steel."
- C. Electrical Raceway Units: Provide UL-labeled cellular floor-deck units complying with UL 209 and listed in UL's "Electrical Construction Equipment Directory" for use with standard header ducts and outlets for electrical distribution systems.
- D. FM Global Listing: Provide steel roof deck evaluated by FM Global and listed in its "Approval Guide, Building Materials" for Class 1 fire rating and Class 1-90 windstorm ratings.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect steel deck from corrosion, deformation, and other damage during delivery, storage, and handling.
- B. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.
  - 1. Protect and ventilate acoustical cellular roof deck with factory-installed insulation to maintain insulation free of moisture.

### PART 2 - PRODUCTS

#### 2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- B. Fire-Resistance Ratings: Comply with ASTM E 119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- C. FM Listing: Provide steel roof deck evaluated by FM and listed in FM's "Approval Guide, Building Materials" for fire rating and windstorm ratings.

#### 2.2 ROOF DECK

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - CMC Joist & Deck.
  - 2. Epic Metals Corporation.
  - 3. Nucor Corp.; Vulcraft Group.
- B. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
  - 1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 40 (275) minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
    - a. Color: Manufacturer's standard.
  - 2. Galvanized and Shop-Primed Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G90 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
    - Color: Gray top surface with white underside.
  - 3. Cellular Deck Profile: Type 1.5 BCA, with bottom plate.
  - 4. Profile Depth: 1-1/2 inches (38 mm)
  - 5. Design Uncoated-Steel Thickness: 0.0474 inch (1.20 mm).

- 6. Design Uncoated-Steel Thicknesses; Deck Unit/Bottom Plate: 0.0474/0.0474 inch (1.20/1.20 mm).
- 7. Span Condition: Triple span or more.
- 8. Side Laps: Interlocking seam.

## 2.3 COMPOSITE FLOOR DECK

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. CMC Joist & Deck.
  - 2. Epic Metals Corporation.
  - 3. Nucor Corp.; Vulcraft Group.
- B. Composite Floor Deck: Fabricate panels, with integrally embossed or raised pattern ribs and interlocking side laps, to comply with "SDI Specifications and Commentary for Composite Steel Floor Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
  - 1. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 40, G90 (Z275) zinc coating.
  - 2. Profile Depth: 2 inches (51 mm).
  - 3. Design Uncoated-Steel Thickness: 0.0474 inch (1.20 mm).
  - 4. Span Condition: Triple span or more.

### 2.4 NONCOMPOSITE FORM DECK

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. CMC Joist & Deck.
  - 2. Consolidated Systems, Inc.; Metal Dek Group.
  - 3. Nucor Corp.; Vulcraft Group.
- B. Non-composite Form Deck: Fabricate ribbed-steel sheet non-composite form-deck panels to comply with "SDI Specifications and Commentary for Non-composite Steel Form Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
  - 1. Uncoated Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 (230) minimum.
  - 2. Galvanized-Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grade 33 (230) G90 (Z275) zinc coating.
  - 3. Profile Depth: 9/16 inch (14 mm).
  - 4. Design Uncoated-Steel Thickness: 0.0358 inch (0.91 mm).

- 5. Span Condition: Triple span or more.
- 6. Side Laps: Overlapped or interlocking seam at Contractor's option.

#### 2.5 ACCESSORIES

- A. General: Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 (4.8-mm) minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), not less than 0.0359-inch (0.91-mm) design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi (230 MPa), of same material and finish as deck, and of thickness and profile recommended by SDI Publication No. 31 for overhang and slab depth.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0747 inch (1.90 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.
- J. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck. For drains, cut holes in the field.
- K. Recessed Sump Pans: Single-piece steel sheet, 0.0747 inch (1.90 mm) thick, of same material and finish as deck, with 3-inch- (76-mm-) wide flanges and level recessed pans of 1-1/2-inch (38-mm) minimum depth. For drains, cut holes in the field.
- L. Galvanizing Repair Paint: SSPC-Paint 20 or MIL-P-21035B, with dry film containing a minimum of 94 percent zinc dust by weight.
- M. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

#### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 31, manufacturer's written instructions, and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
  - 1. Align cellular deck panels over full length of cell runs and align cells at ends of abutting panels.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- Mechanical fasteners may be used in lieu of welding to fasten deck. Locate
  mechanical fasteners and install according to deck manufacturer's written
  instructions.

### 3.3 ROOF-DECK INSTALLATION

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
  - 1. Weld Diameter: 3/4 inch (19 mm), nominal.
  - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds 12 inches (305 mm) apart in the field of roof and 6 inches (150 mm) apart in roof corners and perimeter, based on roof-area definitions in FMG Loss Prevention Data Sheet 1-28.
  - 3. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of 1/2 of the span or 12 inches (457 mm) and as follows:
  - 1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.
  - 2. Mechanically clinch or button punch.
  - 3. Fasten with a minimum of 1-1/2-inch- (38-mm-) long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
  - 1. End Joints: Lapped 2 inches (51 mm) minimum.
- D. Roof Sump Pans and Sump Plates: Install over openings provided in roof deck and mechanically fasten flanges to top of deck. Space mechanical fasteners not more than 12 inches (305 mm) apart with at least one fastener at each corner.
  - 1. Install reinforcing channels or zees in ribs to span between supports and mechanically fasten.
- E. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels according to deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
  - 1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- F. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive according to manufacturer's written instructions to ensure complete closure.
- G. Sound-Absorbing Insulation: Installation into topside ribs of deck as specified in Division 07.

### 3.4 FLOOR-DECK INSTALLATION

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
  - 1. Weld Diameter: 3/4 inch (19 mm), nominal.
  - 2. Weld Spacing: Weld edge ribs of panels at each support. Space additional welds an average of 12 inches (305 mm) apart, but not more than 18 inches (457 mm) apart.
  - 3. Weld Spacing: Space and locate welds as indicated.
  - 4. Weld Washers: Install weld washers at each weld location.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of half of the span or 36 inches (914 mm), and as follows:
  - 1. Mechanically fasten with self-drilling, No. 10 (4.8-mm-) diameter or larger, carbon-steel screws.
  - 2. Mechanically clinch or button punch.
  - 3. Fasten with a minimum of 1-1/2-inch- (38-mm-) long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches (38 mm), with end joints as follows:
  - 1. End Joints: Lapped.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure according to SDI recommendations unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, according to SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.
- F. Install piercing hanger tabs at 14 inches (355 mm) apart in both directions, within 9 inches (228 mm) of walls at ends, and not more than 12 inches (305 mm) from walls at sides unless otherwise indicated.

# 3.5 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Field welds will be subject to inspection.
- C. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
- D. Remove and replace work that does not comply with specified requirements.

E. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

#### 3.6 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.
- B. Repair Painting: Wire brush and clean rust spots, welds, and abraded areas on both surfaces of prime-painted deck immediately after installation, and apply repair paint.
  - 1. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
  - 2. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Division 09.
- C. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05 31 00



## PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the cold-formed metal framing as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. "C" shaped steel studs for exterior non-load bearing wall frame construction.
  - 2. "C" shaped steel joists.

- 3. Supports for mechanical equipment screens at the Student Center are part of Supplemental Bid No. 2. See Section 012313 Supplemental Bids.
- 4. Anchors and accessories.
- 5. Gypsum sheathing.
- 6. Field inspection.

## 1.3 RELATED SECTIONS

- A. Supplemental bids Section 012313.
- B. Unit Masonry Section 042000.
- C. Structural Steel Section 051200.
- D. Thermal Insulation Section 072100.
- E. Vapor permeable air barrier Section 072700.
- F. Aluminum Composite Wall Panels Section 074243.
- G. Interior steel stud construction Section 092900.

## 1.4 QUALITY ASSURANCE

- A. Component Design: Compute structural properties of studs in accordance with AISI "North American Specification for the Design of Cold Formed Steel Structural Members."
- B. Fire-Rated Assemblies: Where framing units are indicated to be components of fireresistance rated assemblies, provide cold formed metal framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspection agency acceptable to authorities having jurisdiction. Products used in the assembly shall carry a classification label from an approved testing and inspection agency.

## C. Qualifications

- 1. Manufacturer's Qualifications: Minimum five years' experience in producing products of the type specified.
- 2. Installer's Qualifications: Minimum three years' experience in installation of the type of product specified.
- Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M "Structural Welding Code - Steel" and AWS DL3 "Structural Welding Code – Sheet Steel."

# D. Pre-Installation Meeting

- 1. Convene meeting at project site within one week of scheduled start of installation with representatives of the following in attendance: Owner, Architect, General Contractor, and metal framing subcontractor.
- 2. Review substrate conditions, requirements of related work, installation instructions, storage and handling procedures, and protection measures.
- 3. Keep minutes of meeting, including responsibilities of various parties and deviations from specifications and installation instructions. Distribute minutes to attendees within 72 hours.

# E. Comply with the following standards:

- 1. American Iron an Steel Institute (AISI):
  - a. "North American Specification for the Design of Cold-Formed Steel Structural Members," latest edition.
  - b. "Standard for Cold-Formed Steel Framing General Provisions."
- 2. American Welding Society (AWS):
  - a. Structural Welding Code (D1.1).
  - b. Specifications for Welding Sheet Steel in Structures (E1.3).

#### 3. ASTM:

- a. ASTM A 653/653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coted (Galvannealed) by the Hot-Dip Process.
- b. ASTM A 780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- c. ASTM A875/875M Standard Specification for Steel Sheet, Zinc-5% Aluminum Alloy Coated by the Hot Dip Process
- d. ASTM A 924 Standard Requirements for Sheet Steel, Metallic-Coated by the Hot-Dipped Process.
- e. ASTM C 955 Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
- f. ASTM A 1003 Standard Specification for Steel Sheet, Carbon, Metallic- and Non-Metallic-Coated for Cold-Formed Framing Members.
- g. ASTM C 1007 Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
- h. ASTM C 1513 Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.

F. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be to be evaluated as part of this specific assembly test. The basis of design products listed herein are a component of the design test assembly selected by the Architect.

#### 1.5 SUBMITTALS

A. Product Data: For information only, submit copies of manufacturer's product information and installation instructions for each item of cold-formed framing and accessories.

# B. Shop Drawings

- Submit shop drawings for special components and installations not fully dimensioned or detailed in manufacturer's product data. Include placing drawings for framing members showing size and gauge designations, number, type, location and spacing. Indicate supplemental bracing, splices, window and door headers accessories and details as may be required for proper installation.
- 2. If the Contractor elects to prefabricate framing members into panels for erection, he shall submit shop drawings of such panels at suitable scale showing all dimensions, components, and methods of fastening and support.
- C. For fasteners, submit product data sheet and samples.

# D. Engineering Data

- 1. Submit Engineering Data drawings to the Architect for review. The Contractor is responsible for the structural design and supports for the cold-formed metal frame, and must show his proposed system and how the Performance Criteria noted below is accommodated on these drawings.
- These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared by a Structural Engineer licensed in the State of Connecticut, and shall be signed and sealed by this Engineer.
- E. Quality Assurance Submittals: Submit the following:
  - 1. Qualifications: Proof of manufacturer, installer, and welder qualifications.
  - 2. Structural design calculations.

#### 3. Certificates

- a. Submit mill certificates signed by framing member/accessory manufacturer certifying compliance with material requirements.
- b. Welder certificates.
- 4. Manufacturer's installation instructions for framing members and framing accessories.

## 1.6 PERFORMANCE CRITERIA

- A. Cold-formed metal framing system shall be designed, fabricated, and installed to withstand a suction and pressure load as listed below with a maximum deflection of L/720 with brick and L/360 with metal wall panels.
  - 1. Design Wind Pressure: Per FM Global Sheet 1-28 Wind Design.
    - a. Theater Building
      - 1). Field (Zone 4): Inward 40.0 psf, Outward 42.5 psf.
      - 2). Corners (Zone 5): Inward 40.0 psf, Outward 49.9 psf.
- B. Design system to accommodate vertical deflection of structural building frame, live loading, seasonal and day/night temperature ranges and construction tolerances.
- C. Comply with prevailing Code requirements for seismic connections and loads.

## 1.7 PRODUCT DELIVERY AND STORAGE

A. Protect metal framing units from rusting and damage. Deliver to one project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade. Store off the ground in a dry ventilated space or protect with suitable waterproof coverings. Conform to storage and handling requirements of AISI "Code of Standard Practice."

#### PART 2 PRODUCTS

#### 2.1 MANUFACTURER

A. Provide cold-formed steel framing manufactured by on of the following: The Steel Network, Marino/Ware, Dale/Incor, Superior Steel Studs, ClarkDietrich Building Systems, Super Stud Building Products.

#### 2.2 METAL FRAMING: GENERAL

A. System Components (16 gauge minimum thickness): With each type of metal framing required, provide manufacturer's standard steel runners, (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners and accessories, as recommended by manufacturer for the applications indicated, as needed to provide a complete metal framing system.

#### 2.3 MATERIALS

- A. Steel Sheet for Studs and Tracks: ASTM A 1003 Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
  - 1. Grade: As required by structural performance.
  - 2. Coating: Galvanized coating conforming to ASTM 653/653M with a minimum G90/Z275 coating designation or conforming to ASTM 875/875M with a minimum GF90/ZGF275 coating designation.
  - 3. 16 Gauge minimum thickness.
- B. Steel Sheet for Clips: ASTM A 653, structural steel, zinc coated, of grade and coating as follows:
  - 1. Grade: As required by structural performance.
  - 2. Coating: Galvanized coating conforming to ASTM 653/653M with a minimum G90/Z275 coating designation or conforming to ASTM 875/875M with a minimum GF90/ZGF275 coating designation.
  - 3. 16 Gauge minimum thickness.

#### 2.4 FRAMING MEMBERS

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges; thickness and grade as required by structural performance.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths compatible with studs, un-punched, with un-stiffened flanges; thickness and grade as required by structural performance.

# 2.5 FRAMING ACCESSORIES

- A. Stamp manufacturer's name on each accessory item.
- B. Provide screws with accessories designated for screw attachment.
- C. Connector Devices

- Vertical Deflection Clips: Basis of Design: "VertiClip," including step bushings, as manufactured by The Steel Network Inc. or "Fastclip Slide Clips" by ClarkDietrich Building Systems or "WSC Clip" by Marino/Ware. Rigid attachments to structure and screw attachment to stud web using step-bushings to permit frictionless vertical movement. 68 mils minimum thickness, size as required by structural design calculations.
- 2. Rigid Clip Angles: Basis of Design: "StiffClip" as manufactured by The Steel Network Inc., or "Moment Clip" by ClarkDietrich Building Systems or "Ridgeclip Connector" by Marino/Ware size as required by structural design calculations. Rigid attachment to structure and stud web.

## D. Bridging

- 1. Cold Rolled Channel: 1-1/2" by ½" by 56 mil thick.
  - a. Bridging Clip: Basis of Design: "BridgeClip" as manufactured by The Steel Network Inc. or "Fastbridge Clip" by ClarkDietrich Building Systems or "Bridge-Rite Clip" by Marino/Ware Provide attachment through stud punchout clamping onto stud web and wrapping around bridging channel. Provide holes for screw attachment to stud web and channel.
- 2. Flat Strap: Width and thickness as required by structural design calculations. Rigid attachment to stud flange.
- 3. Solid Bridging: Channel shaped bridging with lipped flanges and integral formed clips. Screw attachment to stud. 33 mils minimum thickness, size as required by structural design calculations.
- 4. Bridging and accessories shall be hot dip zinc coated per ASTM A 153.
- E. Header for Window and Door Openings: Basis of Design: Provide "ProX Header" system made by Brady Innovations LLC, or subject to compliance with requirements, provide by or "Redheader Pro" by ClarkDietrich Building Systems or "Quickframe Header" by Marino/Ware complete with all accessories including clips and accessories; finish and gauge to match studs.

#### 2.6 FASTENERS

- A. Screws: Corrosion resistant coated, self-drilling, pan or hex washer head. Provide screw type and size as required by structural design calculations.
- B. Anchor Bolts and Studs: ASTM A 307, Grade A, carbon steel, with hex-head carbon steel nuts and flat steel washers. Hot-dip zinc coated in accordance with ASTM A 153. Provide bolt or stud type and size as required by structural design calculations.

- C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
- D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

## 2.7 GALVANIZING TOUCH-UP

A. For touching up damaged galvanized surfaces after erection, provide "Galvlite" made by Z.R.C. Worldwide or subject to compliance with requirements, "ECZ Cold Galvanizing" by Carboline or "Tneme-Zinc Series 90-97" by Tnemec. Apply to a dry film thickness of 1.5 to 3.0 mils.

# 2.8 GYPSUM SHEATHING AND RELATED ACCESSORIES

- A. Gypsum Sheathing: 5/8" thick "Dens-Glass Fireguard," Type X, made by Georgia Pacific, "Securock Glass-Mat Sheathing" or made by U.S. Gypsum Co., "Gold Bond EXP Extended Exposure Sheathing" or made by National Gypsum Co., "Weather Defense" made by Lafarge/Continental, meeting ASTM C 1177, Type X.
- B. Fasteners: 1-1/4" Type S-12 screws "Climaseal" finish.
- C. Joint Treatment: Provide a one-part high performance sealant conforming to ASTM C 920, Type S, Grade NS, Class 25 meeting with the approval of the air/vapor barrier manufacturer for compatibility; see Section 072700 for description. Apply a 3/8" bead of sealant to the joint and trowel flat. Apply enough of the same material to each fastener to cover completely when trowelled flat.

#### 2.9 FABRICATION

- A. Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion in any members in the assembly.
- B. Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting or screw fasteners, as standard with manufacturer.
- C. Wire tying of framing components is not permitted.

#### PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where cold-formed metal framing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION: GENERAL

- A. Methods of construction shall be piece by piece.
- B. Connections shall be accomplished with self-drilling screws or welding so that the connection meets or exceeds the design loads required at that connection.
- C. Studs shall be installed seated squarely (within 1/16") against the web portion of the top and bottom tracks. Tracks shall rest on a continuous, uniform bearing surface.
- D. Cutting of steel framing members may be accomplished with a saw or shear. Torch cutting of loaded members is not permitted. Cutting of loaded members is not permitted unless under supervision of the project architect or engineer.
- E. Temporary bracing shall be provided and left in place until work is permanently stabilized.
- F. Bridging shall be of size and type shown on the approved shop drawings and as called for in the engineering calculations.
- G. Install headers in all openings that are larger than the stud spacing in that wall. Form headers as shown on the drawings.
- H. Insulation meeting the requirements of Section 072100 shall be placed in all jamb and header type conditions that will be inaccessible after their installation into the wall.
- I. Provide jack studs to support each end of headers. These studs shall be securely connected to the header and must seat squarely in the lower track of the wall, and be properly attached to it.
- J. If, by design, a header is low in the wall, the less than full-height studs (cripples) that occur over the header shall be designed to carry all imposed loads.
- K. Wall track shall not be used support any load unless specifically designed for that purpose.
- L. All axially loaded members shall be aligned vertically, to allow for full transfer of the loads down to the foundation. Vertical alignment shall be maintained at floor/wall intersections or alternate provisions for load transfer may be made.

- M. Holes that are field cut into steel framing members shall be within the limitation of the product and its design. Provide reinforcement where holes are cut through load bearing members in accordance with manufacturer's recommendations and as approved by the Architect or Engineer.
- N. Touch up all steel bared by welding using touch-up coating specified herein.
- O. Studs shall be spaced to suit the design requirements and limitations of collateral facing materials.
- P. Care should be taken to allow for additional studs at intersections, corners, doors, windows, control joints, etc., and as called for in the shop drawings or design calculations.
- Q. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.
- R. Provide for structure movement, expansion shall be allowed where indicated and necessary by design or code requirements.
- S. Frame both sides of expansion and control joints with separate studs; do not bridge the joint with components of stud system.
- T. Install horizontal bridging in stud system, spaced (vertical distance) at not more than 48 inches on center. Fasten at each intersection.
- U. Splicing of axially loaded members or floor joists shall not be permitted.
- V. Wire tying of members is not permitted.

#### 3.3 INSTALLATION OF GYPSUM SHEATHING

- A. Fasten sheathing to exterior of each stud with specified fasteners spaced 3/8" from ends and edges and approx. 8" o.c. at each stud. Install fasteners in accordance with manufacturer's recommendations using 2500-RPM maximum screw gun. Sheathing board shall be installed horizontally. Apply sealant between joints and trowel flush; and apply sealant around sheathing perimeter and at interface with other materials. Cover fastener heads with sealant and trowel flush.
- B. Refer to Section 072700 for vapor permeable air barrier description.

**END OF SECTION** 

#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the miscellaneous metal work as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Rough hardware.

- Vertical steel ladders.
- 3. Prefabricated aluminum ship's ladders.
- 4. Steel pipe handrails and railings not part of steel pan stair assemblies.
- 5. Loose steel lintels.
- 6. Light steel framing and supports not included as part of work of other trades.
- 7. Steel gratings and frames.
- 8. Steel plate covers and frames.
- Structural steel door frames at service doors.
- 10. Cast thresholds.
- 11. Elevator divider beams, guide rail beams and elevator pit hold down beams.
- 12. Steel dunnage beams.
- 13. Furnishing stair nosings for interior concrete stairs.
- 14. Steel bollards.
- 15. Miscellaneous steel trim, corner guards, angle guards and channels.
- 16. Countertop supports.
- 17. Masonry support steel.
- 18. Sleeves in concrete walls and slabs.
- 19. Steel framing, bracing, supports, anchors, bolts, shims, fastenings, and all other supplementary parts indicated on drawings or as required to complete each item of work of this Section.
- 20. Prime painting, touch-up painting, galvanizing and separation of dissimilar metals for work of this Section.
- 21. Cutting, fitting, drilling and tapping work of this Section to accommodate work of other Sections and of concrete, masonry or other materials as required for attaching and installing work of this Section.

#### 1.3 RELATED SECTIONS

- A. Structural Steel Section 051200.
- B. Painting and Finishing Section 099000.

#### 1.4 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installation.
- C. Reference Standards: The work is subject to requirements of applicable portions of the following standards:
  - 1. "Manual of Steel Construction," American Institute of Steel Construction.
  - 2. AWS D1-1 "Structural Welding Code," American Welding Society.
  - 3. SSPC SP-3 "Surface Preparation Specification No. 3, Power Tool Cleaning," Steel Structures Painting Council.
  - 4. SSPC PA-1 "Painting Application Specification," Steel Structures Painting Council.
  - 5. "Handbook on Bolt, Nut and Rivet Standards," Industrial Fasteners Institute.
- D. Steel Materials: For steel to be hot dip-galvanized, provide steel chemically suitable for metal coatings complying with the following requirements: carbon below 0.25 percent, silicon below 0.24 percent, phosphorous below 0.05 percent, and manganese below 1.35 percent. Notify galvanizer if steel does not comply with these requirements to determine suitability for processing.
- E. Engage the services of a galvanizer who has demonstrated a minimum of five (5) years' experience in the successful performance of the processes outlined in this specification in the facility where the work is to be done and who will apply the galvanizing and coatings within the same facility as outlined herein. The Architect has the right to inspect and approve or reject the galvanizer/galvanizing facility.
- F. The galvanizer/galvanizing facility must have an ongoing Quality Control/Quality Assurance program which has been in effect for a minimum of five years and shall provide the Architect with process and final inspection documentation. The galvanizer/galvanizing facility must have an on-premise testing facility capable of measuring the chemical and metallurgical composition of the galvanizing bath and pickling tanks.
- G. Inspection and testing of hot-dip galvanized coating shall be done under the guidelines provided in the American Hot-Dip Galvanizers Association (AGA) publication "Inspection of Products Hot-Dip Galvanized After Fabrication."

#### 1.5 PERFORMANCE STANDARDS

A. Railings shall be designed to resist loads per Connecticut Building Code.

#### 1.6 SUBMITTALS

- A. Manufacturer's Literature: Submit manufacturer's specifications, load tables, dimension diagrams, anchor details and installation instructions for products to be used in the fabrication of miscellaneous metal work, including paint products.
- B. Shop Drawings: Shop drawings for the fabrication and erection of all assemblies of miscellaneous iron work which are not completely shown by manufacturer's data sheets. Include plans and elevations at not less than 1" to 1'-0" scale, and include details of sections and connections at not less than 3" to 1'-0" scale. Show anchorage and accessory items.

## C. Engineering Data

- Before any ladders or railings are fabricated, submit engineering data drawings to the Architect for review indicating how performance standards specified here shall be met. The Contractor is responsible for the structural design and supports for these systems and must show his proposed systems on these drawings.
- These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of members. Calculations and drawings must be prepared by a Structural Engineer licensed in the State of Connecticut, and shall be signed and sealed by this Engineer.
- D. Welding shall be indicated on shop drawings using AWS symbols and showing length, size and spacing (if not continuous). Auxiliary views shall be shown to clarify all welding. Notes such as 1/4" weld, weld and tack weld are not acceptable.
- E. Certification: For items to be hot-dip galvanized, identify each item galvanized and to show compliance of application. The Certificate shall be signed by the galvanizer and shall contain a detailed description of the material processed and the ASTM standard used for the coating and, the weight of the coating. In addition, and as attachment to Certification, submit reports of testing and inspections indicating compliance with the provisions of this Section.

## PART 2 PRODUCTS

# 2.1 MATERIALS

A. Metals

- Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- 2. Steel Plates, Shapes and Bars: ASTM A 36.
- 3. Steel Bar Grating: ASTM A 1011 or ASTM A 36.
- 4. Steel Tubing: Cold formed, ASTM A 500; or hot rolled, ASTM A 501.
- 5. Structural Steel Sheet: Hot rolled, ASTM A 570; or cold rolled, ASTM A 611, Class 1; of grade required for design loading.
- 6. Galvanized Structural Steel Sheet: ASTM A 924, of grade required for design loading. Coating designation G90.
- 7. Steel Pipe: ASTM A 53, type and grade as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (Schedule 40), unless otherwise indicated.
- 8. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.
- 9. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
- 10. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
- 11. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
- B. Grout: Non-shrink, non-metallic grout conforming to the requirements of Section 033000.

## C. Fasteners

- 1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
- 2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
- 3. Anchor Bolts: ASTM F 1554, Grade 36.
- 4. Lag Bolts: ASME B18.2.1.
- 5. Machine Screws: ASME B18.6.3.

- 6. Plain Washers: Round, carbon steel, ASME B18.22.1.
- 7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
- 8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
- 9. Lock Washers: Helical spring type carbon steel, ASME B18.21.1.
- D. Shop Paint: Shop prime all non-galvanized miscellaneous metal items using Series 88 Azeron Primer made by Tnemec, ICI Devoe "Rust Guard" quick dry alkyd shop coat No. 41403, or "Interlac 393" by International Protection Coatings.
  - 1. If steel is to receive high performance coating as noted in Section 099000, shop prime using primer noted in Section 099000.
- E. Bituminous Paint: Cold applied asphalt emulsion complying with ASTM D 1187.
- F. Galvanizing Repair Coating: For touching up galvanized surfaces after erection, provide repair coating that is V.O.C. compliant. Apply to a dry film thickness of 1.5 to 3.0 mils.

## 2.2 PRIME PAINTING

- A. Scope: All ferrous metal (except galvanized steel) shall be cleaned and shop painted with one coat of specified ferrous metal primer. No shop prime paint required on galvanized steel or aluminum work.
- B. Cleaning: Conform to Steel Structures Painting Council Surface Preparation Specification SP 3 (latest edition) "Power Tool Cleaning" for cleaning of ferrous metals which are to receive shop prime coat.
  - 1. Steel to get high performance coating as noted in Section 099000 shall be cleaned as per SSPC SP.6 "Commercial Blast Cleaning."

#### C. Application

- 1. Apply shop prime coat immediately after cleaning metal. Apply paint in dry weather or under cover. Metal surfaces shall be free from frost or moisture when painted. Paint all metal surfaces including edges, joints, holes, corners, etc.
- Paint surfaces which will be concealed after shop assembly prior to such assembly. Apply paint in accordance with approved paint manufacturer's printed instructions, and the use of any thinners, adulterants or admixtures shall be only as stated in said instructions.
- 3. Paint shall uniformly and completely cover the metal surfaces, 2.0 mils minimum dry film thickness. No work shall be shipped until the shop prime coat thereon has dried.

- D. Touch-Up: In the shop, after assembly and in the field, after installation of work of this Section, touch-up damaged or abraded portions of shop prime paint with specified ferrous metal primer.
- E. Apply one shop coat to fabricated metal items, except apply two (2) coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

## 2.3 GALVANIZING

- A. Scope: All ferrous metal exposed to the weather, and all ferrous metals indicated on drawings or in specifications to be galvanized, shall be cleaned and then hot-dipped galvanized after fabrication as provided by Duncan Galvanizing or approved equal.
- B. Avoid fabrication techniques that could cause distortion or embrittlement of steel items to be hot-dip galvanized. Fabricator shall consult with hot-dip galvanizer regarding potential warpage problems or handling problems during the galvanizing process that may require adjustment of fabrication techniques or design before finalizing shop drawings and beginning of fabrication.
- C. Cleaning: Thoroughly clean metal surfaces of all mill scale, rust, dirt, grease, oil, moisture and other contaminants prior to galvanizing.
- D. Application: Hot-dip galvanizing shall conform to the following::
  - 1. ASTM A 143: Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel.
  - 2. ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 3. ASTM A 153: Galvanized Coating on Iron and Steel Hardware Table 1.
  - 4. ASTM A 384: Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
  - 5. ASTM A 385: Practice for Providing High Quality Zinc Coatings.
  - 6. ASTM A 924: Galvanized Coating on Steel Sheets.
  - 7. Minimum weight of galvanized coating shall be two (2) oz. per square foot of surface.
- E. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

- F. All galvanized materials must be inspected for compliance with these specifications and marked with a stamp indicating the name of the galvanizer, the weight of the coating, and the appropriate ASTM number.
- G. To minimize surface imperfection (eg: flux inclusions), material to be galvanized shall be dipped into a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing. The type of galvanizing process utilizing a flux blanket overlaying the molten zinc will not be permitted.
- H. After galvanizing all materials not exposed to view must be chromated by dipping material in a 0.2% chromic acid solution.
- Galvanized surfaces, where exposed to view, must have a smooth, level surface finish.
   Where this does not occur, piece shall be rejected and replaced to the acceptance of the Architect.

#### 2.4 PROTECTIVE COATINGS

A. Whenever dissimilar metals will be in contact, separate contact surfaces by coating each contact surface prior to assembly or installation with one coat of specified bituminous paint, which shall be in addition to the specified shop prime paint. Mask off those surfaces not required to receive protective coating.

#### 2.5 WORKMANSHIP

#### A. General

- 1. Miscellaneous metal work shall be fabricated by an experienced fabricator or manufacturer and installed by an experienced tradesman.
- 2. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings and specifications, approved shop drawings, and best practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected.
- 3. All work shall be accurately and neatly fabricated, assembled and erected.
- B. Shop Assembly: Insofar as practicable, fitting and assembly of work shall be done in shop. Shop assemble work in largest practical sizes to minimize field work. It is the responsibility of the miscellaneous metal subcontractor to assure himself that the shop-fabricated miscellaneous metal items will properly fit the field condition. In the event that shop-fabricated miscellaneous metal items do not fit the field condition, the item shall be returned to the shop for correction.

- C. Cutting: Cut metal by sawing, shearing, or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp and free of burrs, without deforming adjacent surfaces or metals.
- D. Holes: Drill or cleanly punch holes; do not burn.
- E. Connections: Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to weather. Locate joints where least conspicuous. Unless indicated otherwise, weld or bolt shop connections; bolt or screw field connections. Provide expansion and contraction joints to allow for thermal movement of metal at locations and by methods approved by Architect.

#### 1. Welding

- a. Shall be in accordance with AWS D1.1 Structural Welding Code of the American Welding Society, and shall be done with electrodes and/or methods recommended by the manufacturer of the metals being welded.
- b. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces; undercut metal edges where welds are required to be flush.
- c. All welds on or behind surfaces which will be exposed to view shall be done so as to prevent distortion of finished surface. Remove weld spatter and welding oxides from all welded surfaces.
- 2. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads exposed to view shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts or adjacent metal.
- F. Operating Mechanism: Operating devices (i.e. pivots, hinges, etc.) mechanism and hardware used in connection with this work shall be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.
- G. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items specified under this Section of the Specifications to be built into concrete, masonry or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- H. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.

#### J. Exposed Work

- In addition to requirements specified herein and shown on drawings, all surfaces exposed to view shall be clean and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs, and other defects which mar appearance of finished work.
- Metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design.
- Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.
- K. Preparation for Hot-Dip Galvanizing: Fabricator shall correctly prepare assemblies for galvanizing in consultation with galvanizer and in accordance with applicable Reference Standards and applicable AGA publications for the "Design of Products to be Hot-Dip galvanized After Fabrication." Preparation shall include but not be limited to the following:
  - 1. Remove welding flux.
  - 2. Drill appropriate vent holes and provide for drainage in inconspicuous locations of hollow sections and semi-enclosed elements. After galvanizing, plug vent holes with shaped lead and grind smooth.

# 2.6 MISCELLANEOUS METALS ITEMS

## A. Rough Hardware

- Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 Sections.
- 2. Fabricate items to sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood connections; elsewhere, furnish steel washers.

# B. Ladders

1. Vertical steel ladders shall be eighteen (18) inches wide with 3/4" diameter non-slip steel rungs spaced twelve (12) inches o.c. Stringers shall be 3/8" thick by 2-1/2" wide steel bars; rungs welded to bars. Attach ladders to walls six (6) inches from top and bottom and maximum thirty-six (36) inches o.c. from these points. At

- the roof, gooseneck the rails back to the structure to provide secure ladder access.
- 2. Aluminum Ship's Ladders: Provide prefabricated ship's ladders where noted. Fabricate open type construction with extruded aluminum channels stringers, aluminum pipe Schedule 40 handrails, and extruded aluminum serrated treads. Provide all necessary brackets and fittings for installation.
- 3. Ladders shall be fabricated to support a live load of one hundred (100) lbs. per square foot and a concentrated load of three hundred (300) lbs. per rung; loads not to act simultaneously.

# C. Steel Pipe Handrails

- Steel pipe of size shown on Drawings, Schedule 40. Fittings shall be flush type, malleable of cast iron. Brackets shall be malleable iron, design as selected by the Architect.
- Construction: Form direction changes in rails using solid bar stock or elbows.
  Connections shall be shop welded and ground smooth and flush, except where
  field connections and expansion joints are required. Field connections may be
  welded, internal sleeve and plug weld, or internal sleeve and set screw.
- 3. Secure handrails to walls with wall brackets. Provide brackets of malleable iron castings, with not more than three (3) inches clearance from inside face of handrail to wall surface. Neatly drill wall plate portion of the bracket into concrete or masonry to receive bolts for concealed anchorage. For installation at drywall, Drywall trades shall provide plate to receive wall plate portion of bracket and anchor or bolt wall plate through drywall to supporting steel plate. Locate brackets at not more than 5'-0" o.c. unless otherwise shown.
- 4. Provide wall return fittings of cast iron, flush type, with the same projection as that specified for wall brackets.
- 5. Longitudinal members shall be parallel with each other and with floor surface or shape of stair to a tolerance of 1/8" in 10'-0" linear feet. Center line of members within each run of railing shall be in the plane.
- 6. For steel pipe posts where indicated, anchor posts in concrete by means of pipe sleeves set and anchored into concrete. Provide sleeves of galvanized steel pipe, not less than six (6) inches long and having an inside diameter not less than 1/2" greater than outside diameter of the inserted pipe. Provide steel plate closure secure to bottom of sleeve and of width and length not less than one (1) inch greater than outside diameter of sleeve. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-ferrous grout. Cover anchorage joint with a round steel flange welded to post. Posts shall be set plumb within 1/8" vertical tolerance.

- 7. Steel pipe handrails shall be capable of resisting a two hundred (200) lb. force applied to rail from any direction and a uniformly distributed load of fifty (50) lbs. per linear foot applied downward or horizontally, loads not to act simultaneously.
- D. Loose Steel Lintels: Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit where indicated. Provide not less than eight (8) inches bearing at each side of openings, unless otherwise indicated.
  - 1. Loose lintels shall conform to the Schedule on the drawings.
  - 2. At columns or vertical surfaces where lintels cannot bear on masonry, provide clip angles sized for structural capacity of lintel.
- E. Miscellaneous Light Steel Framing
  - Light steel framing, bracing, supports, framing, clip angles, shelf angles, plates, etc., shall be of such shapes and sizes as indicated on the drawings and details or as required to suit the condition and shall be provided with all necessary supports and reinforcing such as hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly support and rigidly fasten and anchor same in place and to steel, concrete, masonry and all other connecting and adjoining work.
  - 2. All light steel framing steel shall be furnished and erected in accordance with the applicable requirements of the "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" by the American Institute of Steel Construction and as specified herein.
- F. Steel Gratings and Frames: Provide hot dipped galvanized steel gratings complying with FS RR-G-661 with rectangular cross bars welded to bearing bars. Bars to have plain wearing surface.
  - 1. Manufacturer: Provide gratings manufactured by Reliance, Borden, Irving Subway Grating, or approved equal.
  - 2. Hinged Section: Provide hinged sections in areaway gratings where required by the drawings. Each hinged section up to 4'-0" wide shall be provided with two (2) five knuckle, fast pin, regular weight, plain bearing, wrought bronze butt hinges. Each hinged section over 4'-0" wide shall be provided with three (3) butt hinges. Hinged sections shall have provisions for padlocking on the underside.
  - Furnish grating frames, with corners mitered, welded and ground smooth, and with welded-on straps for secure anchorage into concrete. Frames and anchors to be galvanized.

- 4. Structural Performance: Provide gratings capable of withstanding the following structural loads without exceeding the allowable design working stress of the materials involved, including anchors and connections:
  - a. Floors: Capable of withstanding a uniform load of 250 lbf/sq. ft. or a concentrated load of 3000 lbf, whichever produces the greater stress.
  - b. Walkways and Elevated Platforms Other Than Exits: Capable of withstanding a uniform load of 60 lbf/sq. ft. Limit deflection to L/360 or 1/4", whichever is less.
  - c. Walkways and Elevated Platforms Used as Exits: Capable of withstanding a uniform of 100 lbf/sq. ft. or a concentrated load of 300 lbf on an area of 4 sq. in., whichever produces the greater stress. Limit deflection to L/360 or 1/4", whichever is less.
  - d. Sidewalks and Vehicular Driveways: Capable of withstanding a uniform load of 250 lfb/sq. ft. or a concentrated load of 8000 lbf, whichever produces the greater stress.
- G. Pit Covers and Frames: Provide minimum 1/2" thick steel checkered plate cover, reinforced as required to limit deflection to 1/360 of span, with two (2) recessed lifting handles capable of supporting five hundred (500) lbs. each. Furnish covers with steel angle frames, with corners mitered, welded and ground smooth, and with welded-on straps for secure anchorage into concrete. Frames and anchors to be galvanized. Plate covers shall be capable of supporting same loads as adjacent floor surfaces.

# H. Structural Steel Door Frames

- 1. Fabricate steel door frames of structural shapes and bars, fully welded, uniform, square and true. Plug weld built-up members, continuously weld exposed joints; grind exposed welds smooth. Provide 5/8" x 1-1/2" steel bar stops. Secure removable stops to frame with countersunk machine screws, uniformly spaced at not more than ten (10) inches o.c.
- 2. Provide necessary reinforcements and drill and tap as required for finish hardware.
- 3. Provide steel strap anchors for securing door frames into adjoining concrete or masonry, using 1/8" x 2" straps of the length required for a minimum eight (8) inch embedment. Weld anchors to frame jambs no more than twelve (12) inches from both bottom and head of frame and space anchors not more than thirty (30) inches apart.
- 4. Extend bottom of frames to floor elevation and secure to concrete with steel angle clips welded to frames, anchored with expansion shields and bolts.
- I. Cast Thresholds

- 1. Fabricate of sizes and configurations as shown. Provide cast iron units with integral abrasive finish. Furnish in lengths as required to accurately fit each opening or condition.
  - a. Cast units with an integral abrasive grit consisting of aluminum oxide, silicone carbide, or a combination of both.
- 2. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
  - a. Provide two (2) rows of holes for units over five (5) inches wide, with two (2) holes aligned at ends and staggered intermediate holes.
- 3. Apply black asphaltic coating to concealed bottoms, sides and edges of cast iron units set into concrete.
- 4. Provide a diamond surface texture.
- J. Safety Nosings for exterior Concrete Stairs
  - 1. Provide three (3) inch wide, Style A alumogrit safety nosing with hatched abrasive surface extending to end of stringers, manufactured by American Abrasive Metals Co., or e Wooster Products Inc. or American Mason Safety Tread Co.
  - 2. Provide anchors spaced not more than four (4) inches from each end and not more than twelve (12) inches o.c. Furnish nosings to concrete trades for installation.
  - 3. Apply asphaltic coating to surfaces in contact with concrete.
- K. Steel Bollards: Provide six (6) inches O.D. extra strong (Schedule 80) steel pipe, concrete filled, with base of steel plate for mounting to anchor bolts in concrete foundation. Rabbet top of steel pipe and insert 1/4" steel plate cap, flush with top of pipe. Weld top of cap to pipe and grind smooth and flush.
- L. Miscellaneous Steel Trim: Provide shapes and sizes for profiles shown. Except as otherwise indicated, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.
- M. Corner Guards: Provide steel corner guards where shown. Unless otherwise indicated, use 4" x 4" x 1/4" steel angles to a height of four (4) feet above finished floor with
  - 1-1/4" x 8 1/4" bent steel strap anchors welded to backs of angles at each end and approximately sixteen (16) inches o.c. Set and adjust guards to finish flush with adjacent surfaces.

- N. Countertop Supports: Steel framing as indicated or required to support countertops. Conceal framing under countertops and within wall behind countertops. Provide supports to withstand a concentrated load of not less than three hundred (300) lbs. applied at any point with a deflection not to exceed L/240 for the length of the countertop.
- O. Masonry Support Steel: Provide galvanized steel, relieving angles, plates, accessories and other steel shapes for masonry support steel; for lintels refer to Para. D. herein.
  - 1. Fabricate masonry support steel to allow final adjustment with the closest tolerances possible. Relieving angles which require cutting to fit masonry flashing shall be straightened without deflections.
  - 2. Coordinate masonry support system with concrete work for locations of wedge inserts.
  - 3. Install to meet requirements of building masonry work, face brick coursing and stone placement. Coordinate final adjustments with masonry work as work progresses.

#### P. Sleeves in Concrete Walls and Slabs

- 1. Sleeves through concrete walls shall be of Schedule 40 steel pipe with i.d. two (2) inches larger than o.d. of pipe or conduit (including insulation, if any) to be accommodated. Sleeves shall project one-half (1/2) inch on each side of finished wall. Provide rectangular one-quarter (1/4) inch steel plate collar at center, continuously welded to the perimeter of the sleeve, and six (6) inches wider than the o.d.
- 2. Slots in slabs shall be 12 gauge steel sheet, galvanized, of dimensions indicated, with strap anchors welded in place not more than twelve (12) inches on centers.

#### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where miscellaneous metal is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 ERECTION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, throughbolts, lag bolts, wood screws, and other connectors as required.

- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry, or similar construction.
- C. Fitting Connections: Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance, and quality of welds made, and methods used in correcting welding work.
- E. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- F. Field Touch-Up of Galvanized Surfaces: Touch-up shop applied galvanized coatings damaged during handling and installation. Use galvanizing repair coating specified herein for galvanized surfaces.

**END OF SECTION** 

#### PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ornamental metals, including heavy gauge stainless steel and non-ferrous metal products which are used in building construction for functional, architectural, and decorative effects, and which are not a part of other metal systems specified in other Sections. The extent of these items is indicated on the drawings and/or specified herein, including, but not limited to, the following:

- 1. Decorative railings and handrails.
- 2. Aluminum panels, perforated and unperforated.
- 3. Aluminum fabrication for projector mount.
- 4. Stainless steel bollards with integrated alarms, card readers and auto door opener buttons.

#### 1.3 RELATED SECTIONS

A. Miscellaneous Metals - Section 055000.

#### 1.4 QUALITY ASSURANCE

- A. General: Work of this section shall be fabricated and installed by an experienced fabricator or manufacturer who has been engaged in work of equivalent scope and fabrication standards for at least five (5) years. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings, specifications, and approved shop drawings, and be of highest quality practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled, and erected.
- B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of the work. However, do not delay job progress; allow for adjustments and fitting where taking of field measurements before fabrication might delay the work.
- C. Shop Assembly: Insofar as practicable, fitting and assembly of work shall be done in shop. Work that cannot be permanently shop assembled, shall be completely assembled, marked and disassembled in shop before shipment to insure proper assembly in field. Shop assemble work in largest practical sizes to minimize field work. It is the responsibility of the Contractor for this work to assure himself that the shop fabricated items will properly fit the field condition. In the event that shop fabricated items do not fit the field condition, the item shall be returned to the shop for correction.

#### 1.5 SUBMITTALS

- A. Shop Drawings: Submit for all items of work of this Section, as enumerated under paragraph 1.2, showing locations, layouts, materials, thicknesses, finishes, dimensions, construction, relation to adjoining construction, erection details, profiles, jointing and all other details to fully illustrate the work of this Section.
- B. Samples: Submit fabricated samples (of sufficient size to fully show construction, materials and finishes) of all items of work as enumerated under paragraph 1.2 herein.

- C. Product Data: Submit manufacturer's, fabricator's and finisher's specifications and installation instructions for products used in ornamental metal work, including finishing materials and methods.
- D. Samples for Verification: For each type of exposed finish required, prepared on 1500 mm square samples of metal of same thickness and material indicated for the Work.
- E. Contractor Licensed Engineer Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- F. Coordination Drawings: For decorative formed metal elements that house items specified in other Sections. Show dimensions of housed items, including locations of housing penetrations and attachments and necessary clearances.

#### 1.6 COORDINATION

- A. Coordinate installation of anchorages for decorative formed metal items. Furnish setting drawings, templates and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts and items with integral anchors, that are to be embedded in concrete to masonry. Deliver such items to Project site in time for installation.
- B. Coordinate installation of decorative formed metal with adjacent construction to ensure that wall assemblies, flashings, trim and joint sealants, are protected against damage from the effects of weather, age, corrosion and other causes.

#### 1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.
- 1.8 PERFORMANCE STANDARDS FOR RAILINGS (UNLESS GREATER REQUIRED BY CODE)
  - A. Railing assemblies shall be designed and installed to resist the simultaneous application of a lateral force of 50 PLF and a vertical load of 100 PLF, both applied to the top of the railing. The rail shall resist a total lateral force and total vertical load of at least 200 lbs. each.
  - B. Submit calculations and drawings signed and sealed by a Professional Engineer licensed in the State of Connecticut indicating that the railing system can meet these performance criteria.

#### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Provide materials which have been selected for their surface flatness, smoothness and freedom from surface blemishes where exposed to view in the finished unit. Exposed to view surfaces which exhibit pitting, seam marks, roller marks, "oil-canning," stains, discolorations, or other imperfections on the finished units will not be acceptable.
- B. Aluminum: Comply with the following standards for the forms and types of aluminum for the required items of work.
  - 1. Alloy and Temper: Provide alloy and temper as indicated or as otherwise recommended by the aluminum producer or finisher.
    - a. Aluminum Extrusions, Bars and Shapes: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T6.
    - b. Extruded Pipe and Tube: ASTM B 429, alloy 6063-T6.
    - c. Aluminum Plate and Sheet: Alloy and temper recommended by aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 209, alloy 6061-T6.
    - d. Bars, Rods and Wire: ASTM B 211.
    - e. Drawn Seamless Tube: ASTM B 483, alloy 6063-T832.
    - f. Castings: ASTM B 26; alloy A356-T6.
    - g. Forgings: ASTM B 247, alloy 6061-T6.
- C. Stainless Steel: Comply with the following standards for the forms and types of stainless steel for the required items of work.
  - 1. Pipe: ASTM A 312, Grade TP 304 (interior) and 316 (exterior).
  - 2. Sheet, Strip, Flat Bar and Plate: ASTM A 666, Type 304 (interior) and 316 (exterior).
  - 3. Tubing: ASTM A 554, Grade MT 304 (interior) and 316 (exterior).
  - 4. Castings: ASTM A 743, Grade CF 8 or CF 20.
  - 5. Bars and Shapes: ASTM A 276, Type 304 (interior) and 316 (exterior).
- D. Malleable Iron Castings: ASTM A 48, Class 30, and shall be uniform in quality, free from blow holes, porosity, hard spots, shrinkage defects, swells, cracks or other defects. Surfaces shall be smooth and true to pattern.

- E. Exposed Steel (cold rolled)
  - 1. Structural Shapes and Sheets: ASTM A 1008.
  - 2. Strip: ASTM A 109.
- F. Steel (Carbon) for Concealed Supports Only
  - 1. Structural Shapes: ASTM A 36.
  - 2. Plates (for forming or bending cold): ASTM A 283, Grade C.
  - 3. Steel Sheets: ASTM A 366, Grade 1.
  - 4. Shop prime with rust inhibitive primer equal to Series 88 Azeron made by Tnemec, or made by Benjamin Moore or Sherwin Williams.
- G. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.
- H. Fasteners: Furnish basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Provide Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- I. Anchors and Inserts: Either furnish inserts to be set in concrete or masonry work, or provide other anchoring devices as required for the installation of ornamental metal items. Provide toothed steel or lead shield expansion bolt devices for drilled-in-place anchors. Provide galvanized or cadmium-coated anchors and inserts for exterior installations.
  - 1. Provide units with exposed surfaces matching the texture and finish of the metal item anchored.
- J. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).
- K. Cast-in-Place and Preinstalled Anchors: Anchors fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete.
- L. Sealants, Interior: Nonsag, paintable, nonstaining, latex sealant complying with ASTM C834; of type and grade required to seal joints in decorative formed metal; and as recommended in writing by decorative formed metal manufacturer.
  - 1. Sealants shall have a VOC content of not more than 250 g/l when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

- M. Filler Metal and Electrodes: Provide type and alloy of filler metal and electrodes as recommended by produced of metal to be welded or brazed and as necessary for strength, corrosion resistance, and compatibility in fabricated items
  - 1. Use filler metals that will match the color of metal being joined and will not cause discoloration.

## 2.2 FABRICATION

- A. All custom stainless steel fabrications shall be manufactured in a facility exclusively used for the assembly, welding and polishing of stainless steel with dedicated tooling, fixtures and machine tools for manufacture of stainless steel products. This is to avoid contamination with other metals, especially carbon steel.
- B. Cutting: Cut metal by sawing, shearing or blanking. Flame cutting will be permitted only if cut edges are ground back to clean, smooth edges. Make cuts accurate, clean, sharp, square and free of burrs, without deforming adjacent surfaces or metals.
- C. Holes: Drill or cleanly punch holes (do not burn), so that holes will be accurate, clean, neat and sharp without deforming adjacent surfaces or metals.

## D. Connections

- 1. Make connections with tight joints, capable of developing full strength of member, flush unless indicated otherwise, formed to exclude water where exposed to water. Locate joints where indicated on drawings. Provide connections to allow for thermal movement of metal at locations and by methods approved by Architect. For work exposed to view, use concealed fasteners (unless welded or other connections indicated) with joints accurately fitted, flush and rigidly secured with hairline contacts. All edges within public reach shall be eased.
- Welding: Welding shall be in accordance with recommendations of the American Welding Society and shall be done with electrodes and/or methods recommended by the manufacturers of the metals being welded. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces so that joint will not be visible; undercut metal edges where welds are required to be ground flush and dressed smooth. All welds on or behind surfaces which will be exposed to view shall be done so that finished surface will be free of imperfections such as pits, runs, splatter, cracks, warping, dimpling, depressions or other forms of distortion or discoloration. Remove weld splatter and welding oxides from all welded surfaces.
- Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads, where shown to be exposed to view, shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts of adjacent metal.

- E. Operating Mechanism: Operating devices, mechanism and hardware used in connection with this work shall be fabricated, assembled, installed and adjusted after installation so that they will operate smoothly, freely, noiselessly and without excessive friction.
- F. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items for architectural metal work to be built into concrete, masonry, or work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- G. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- H. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.
- I. Exposed Work: In addition to requirements specified herein or shown on drawings, all surfaces exposed to view shall be clean, and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs and other defects which mar appearance of finished work. Ornamental metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.
- J. Materials used shall be of such strength, thickness and alloy that they are capable of meeting all standards and descriptions specified herein and as detailed on drawings.
- K. Bending: Bend sheet metal to the required shape. Bent items shall be free of grain separation, oil canning or other distortion.
  - Square Bends: Back-cut sheets to attach maximum square bend possible, with maximum radius of 1/16 in.
  - 2. Knife Edge Bends: Back-cut and back bevel sheets to attain sharpest bend possible, with maximum radius of 1/32 in.

#### 2.3 SHOP FINISHING

#### A. General

- 1. Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated.
- 2. Provide colors or color matches as indicated on selected samples.

- 3. Protect mechanical finishes on exposed surfaces from damage by application of strippable temporary protective covering prior to shipment.
- 4. Corrosion Protection: Coat concealed surfaces which will be in contact with concrete, masonry, wood or dissimilar metals, in exterior work and work to be built into exterior and below grade walls and decks, with a heavy coat of bituminous paint. Do not extend coating onto exposed surfaces.

## B. Aluminum

- 1. Class II Clear Anodized Finish: AA-M12C22A31, medium satin directional textured mechanical finish; inhibited chemical cleaning; 0.4 mil minimum thick anodic coating conforming to AAMA Spec. 607.1.
- 2. Class I Color Anodized Finish: AA-M12C22A42/A44, Smooth non-specular buffed mechanical finish; chemical etch, medium matte; 0.18 mil minimum thick integrally colored or electrolytically deposited coating conforming to AAMA 608.1 or 606.1.
  - a. Match color range of Architect's samples.
- Baked Enamel Finish: AA-C21C42R1x, cleaned with inhibited chemicals, corrosion coated with an acid-chromate-fluoride-phosphate treatment, and painted with organic coating specified below. Apply baked enamel finish in strict compliance with paint manufacturer's specifications for cleaning, conversion coating and painting.
  - Organic Coating: Thermosetting modified acrylic enamel primer/topcoat system complying with AAMA 603.8 except with minimum dry film thickness of 1.5 mils; medium gloss.
- 4. High Performance Coating: AA-C12C42R1x, cleaned with inhibited chemicals, conversion coated with an acid-chromate-fluoride-phosphate treatment, and painted with organic coating specified below. Apply finish in strict compliance with paint manufacturer's instructions using a licensed applicator.
  - a. Fluorocarbon Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.
  - b. Custom color and gloss as selected by the Architect.
- 5. Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
  - a. Color and Gloss: Custom as selected by the Architect.

#### C. Stainless Steel

- 1. Remove or blend tool and die marks and stretch lines into finish.
- Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.
- 3. Bright, Directional Polish: No. 4 finish.
- 4. Satin, Directional Polish: No. 6 finish.
- 5. Satin Reflective, Directional Polish: No. 7 finish.
- 6. Mirror-Like Reflective, Non-Directional Polish: No. 8 finish.
- 7. Blackened Stainless Steel Finish: #4 satin stainless steel with oxidized finish similar to Stuart Dean finish OM-2.
- 8. When polishing is complete, passivate and rinse surfaces. Remove foreign matter and leave surface chemically dry.

# 2.4 PROTECTION

A. Provide necessary protection to all exposed surfaces of architectural metal work, so as to prevent damage, staining, discoloration, abrasion, etc., to these surfaces from time of shipment from factory to acceptance of work of this project. Protection shall be provided by wrappings, strippable coatings, or other means. After installation, remove protective paper or strippable coating and clean exposed surfaces, and then provide additional temporary protection to protect architectural metal work from damage during subsequent construction activities. Surfaces which are damaged, stained, discolored, abraded etc., shall be rejected and replaced with new materials, at no cost to the Owner.

## 2.5 STEEL FRAMING, BRACING, SUPPORTS AND REINFORCEMENTS

A. Steel framing, plate reinforcing, supplementary steel framing or reinforcing, bracket assemblies, and the like required for the support, framing, reinforcing, bracing, etc., of work of this Section shall be of such sizes and shapes as indicated on the drawings, or as required to suit the conditions, and shall be provided with all necessary supports and accessory items such as inserts, hangers, braces, struts, clip angles, anchors, bolts, nuts, welds, etc., as required to properly and rigidly fasten, anchor or attach work of this Section in place and to the concrete, masonry and other connecting and adjoining work.

#### 2.6 ORNAMENTAL HANDRAILS AND RAILINGS

- A. Welded Connections: Fabricate handrails and railings for connecting members by welding. Cope components at perpendicular and skew connections to provide close fit, or use fittings designed for this purpose. Weld connections continuously to comply with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove flux immediately.
  - 4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
  - 5. Form changes in direction of railing members by radius bends.
  - Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting, or otherwise deforming exposed surfaces of handrail and railing components.
  - 7. Provide wall returns at ends of wall-mounted handrails, close ends of returns.
  - 8. Close exposed ends of handrail and railing members with prefabricated end fittings.
  - Brackets, Flanges, Fittings, and Anchors: Provide brackets, flanges, miscellaneous fittings, and anchors to interconnect handrail and railing members to other work, unless otherwise indicated.
    - a. Furnish inserts and other anchorage devices for connecting handrails and railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by handrails and railings. Coordinate anchorage devices with supporting structure.
    - b. For railing posts set in concrete, provide preset sleeves of steel, not less than 6 inches long and inside dimensions not less than 1/2 inch greater than outside dimensions of post, with steel plate forming bottom closure.

# 2.7 METAL PANELS

A. Fabricate of aluminum as shown on drawings, minimum thickness of 3/16", with minimum deflection of L/360.

- B. Metal panels must read as flat and free of bow, oil-canning, or read-through of stiffeners. To this end, exposed metal faces when supported in the building shall be of such flatness that the maximum uniform bow in 2 ft. shall not exceed 1/32", and the maximum overall variation in plane between high and low point within a panel shall not exceed 1/16".
- C. Theater House Walls: Provide panels with custom perforation pattern indicated. Perforations shall be laser or water jet cut. Linear perforation pattern shall have translucent acrylic panels mounted behind openings for light transmission, as detailed. Mounting shall be concealed, with clip attachment to substrate walls. Provide splines at joints, rout and return corners, gasketed joints, and all other components as indicated on the drawings. All exposed portions of panels, as well as any exposed fasteners, shall have a powder-coat finish in color as selected by the Architect.

# 1. Manufacturers

- a. John w. Mcdougall Co., Nashville, TN. 615-301-0780 (Basis of Design)
- b. Caliper Studio, Brooklyn, NY 718-302-2427
- c. Zahner, Kansas City, MO 816-474-8882
- d. Ferra Designs, Brooklyn, NY 718.852.8629
- 2. Prior to fabricating panels, provide a mock-up of panel assembly as indicated on the drawings, including powder-coated panel, acrylic panels, fasteners, substrate and lighting.
- D. Student Commons Vestibule: Provide perforated and unperforated box type panels, in custom sizes as shown on the drawings. Panels with perforation pattern shall be Type ½" diameter holes at 0.707" diagonal centers, 39% open. Mounting shall be concealed, with clip attachment to substrate walls. Panels shall have a powder-coat finish that is UV stable in natural light, in color as selected by the Architect from full range of custom powder coatings.
  - Profiles and details shown on drawings are those of Ceilings Plus "Wallforms" (Basis of Design) unless otherwise noted; subject to compliance with requirements specified, other acceptable manufacturers are
  - 2. Forms and Surfaces, "LEVELe" or
  - 3. Mllgo Bufkin Metal Fabrications

#### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where ornamental metal work is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do

not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION

A. General: Install work of this Section square, plumb, straight, true to line or radius, accurately fitted and located, with flush, tight hairline joints (except as otherwise indicated or to allow for thermal movement), with provisions for other trades, with provisions to allow for thermal movement, with provisions to exclude water where exposed to weather, and with attachment devices as required for secure and rigid installation. It is the responsibility of the Contractor to assure himself that shop fabricated architectural metal items will properly fit the field condition. In cases where the shop fabricated architectural metal items do not fit the field condition, the item shall be returned to the shop for correction.

#### B. Attachments

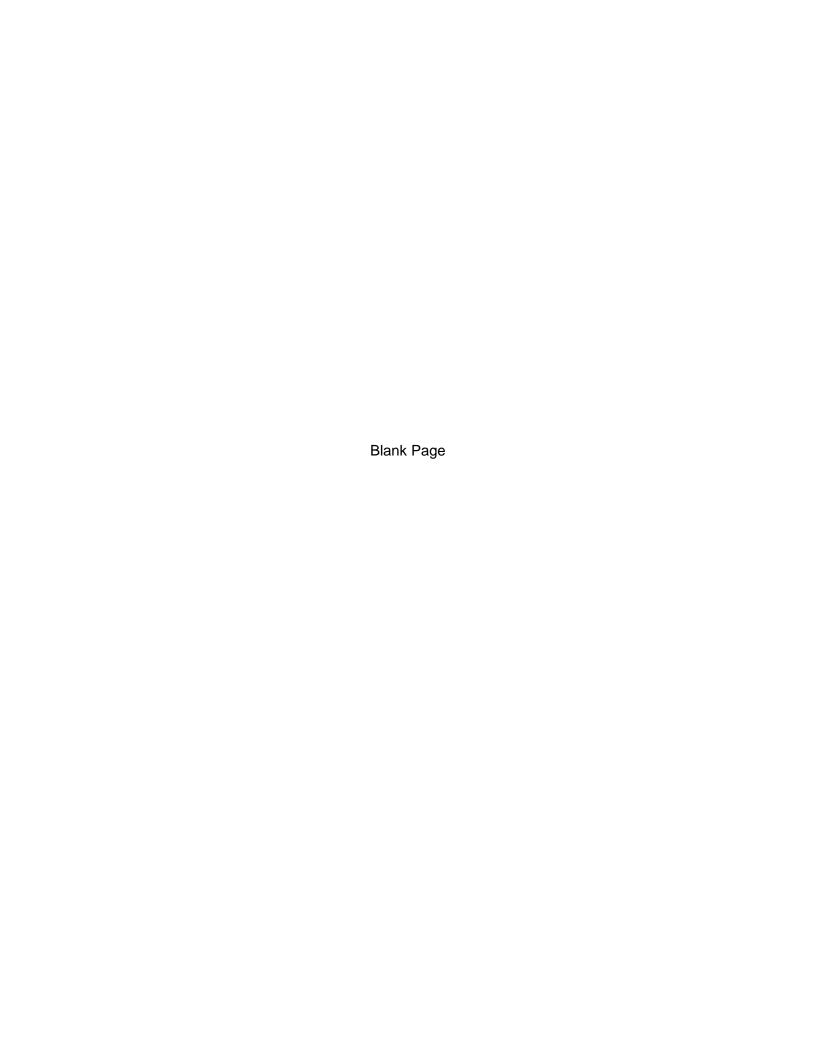
- 1. Unless otherwise indicated, work to be built into concrete or masonry shall be anchored with shop welded on galvanized steel strap anchors; work to be attached to concrete or masonry shall be anchored by bolts into embedded inserts or expansion shields; work attached to structural steel shall be anchored by welds or bolts; work attached to metals other than structural steel shall be anchored by bolts or screws. Power actuated fasteners not permitted unless approved by Architect. Provide all supplementary parts necessary to complete each item of work of this Section.
- 2. All attachment devices shall be of type, size and spacing to suit condition and as approved by Architect. Provide shims, slotted holes, or other means necessary for leveling, plumbing and other required adjustments. Attachment devices for work exposed to view shall be concealed, unless indicated otherwise. Where bolts or screws are permitted in work exposed to view, they shall be oval head and counter sunk, unless otherwise noted, with projecting end cut off flush with nuts or adjacent material, and shall match adjacent surfaces.
- Do all necessary drilling, tapping, cutting or other preparations of surrounding construction in the field accurately, neatly and as necessary for the attachment and support of work of this Section, but obtain Architect's approval prior to such preparation to work of others.
- C. Tolerances: All work of this Section shall be plumb, square, level, true to radius and correctly aligned within the following limitations:
  - Offset from true horizontal, vertical and design location shall not exceed 1/16" per ten (10) feet of length for any component, not cumulative.
  - 2. Maximum offset from true alignment between abutting components shall not exceed 1/32".

- D. All railings shall be installed to withstand loads as required by prevailing Building Code.
- E. Do not cut or abrade finishes which cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units at Contractor's option.
- F. Install concealed gaskets and joint fillers as the work progresses, so as to make the work soundproof or lightproof as required.
- G. Restore protective coverings which have been damaged during shipment or installation of the work. Remove protective coverings only when there is no possibility of damage from other work yet to be performed at the same location.
- H. Retain protective coverings intact and remove simultaneously from similarly finished items to preclude non-uniform oxidation and discoloration.
- Field Welding: Comply with AWS Code for the procedures of manual shielded metalarc welding, the appearance and quality of welds made, and the methods used in correcting welding work.

# 3.3 CLEANING AND PROTECTION

- A. Clean aluminum and stainless steel by washing thoroughly with clean water and soap and rinsing with clean water.
- B. Protect finishes of ornamental metal from damage during construction period with temporary protective coverings approved by ornamental metal fabricator. Remove protective covering at the time of Substantial Completion.
- C. Restore finishes damaged during construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units.

**END OF SECTION** 



#### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural stairs as indicated on the drawings and specified herein, including, but not limited to, the following:
  - 1. Open-riser AESS steel stair with low-iron, laminated and tempered glass treads set into stainless steel support frame.

- 2. Clips, hangers, inserts, braces, and other supports for stair construction.
- 3. Glass panel guardrails set into steel plate stringers.
- Stainless steel handrails and brackets.

# 1.3 RELATED SECTIONS

- A. Structural Steel Section 051200.
- B. Architecturally-Exposed Structural Steel Section 051210.
- C. Ornamental Metals Section 057000.
- D. Ornamental Glass Rail System Section 057313.
- E. Installation of inserts in drywall furnished by this Section Section 092900.
- F. Painting and Finishing Section 099000.

### 1.4 QUALITY ASSURANCE

- A. General: Work of this section shall be fabricated and installed by an experienced fabricator or manufacturer who has been engaged in work of equivalent scope and fabrication standards for at least five (5) years. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings, specifications, and approved shop drawings, and be of highest quality practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled, and erected.
- B. Qualification of Welders: Use only certified welders and the shielded arc process for all welding performed in connection with the work of this Section. Protect adjacent surfaces when field welding to prevent damage or stain. Welders and welding operators must be qualified by tests as provided by AWS.
- C. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with:
  - 1. "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction.
  - 2. "Code for Welding in Building Construction" of the American Welding Society.
  - 3. "Metal Stairs Manual" of the National Association of Architectural Metal Manufacturers.

- D. Conflicting Requirements: In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards of these specifications, the provisions of the more stringent shall govern.
- E. Field Measurements: If construction process permits, take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress. Allow for trimming and fitting wherever taking field measurements before fabrication might delay work.
- F. Tolerances: Allow for construction tolerances as required.
- G. Coordination: Coordinate this work with the work of all other trades interfacing with architectural stairs, such as structural and other trades as required.

### 1.5 DRAWING SUBMISSION

A. General: It is the intent of the Working Drawings to display the layouts and general design parameters upon which the Shop Drawings shall be developed. Detail development and all connections shall be part of Shop Drawing Development. Show metal thicknesses, arrangement and joining of components, and details indicating provisions for thermal movement and fastening.

# B. Shop Drawings

- 1. Before any steel stairs are fabricated, submit shop drawings to the Architect for approval.
- 2. Show all locations, markings, quantities, materials, sizes and shapes, and indicate all methods of connecting, anchoring, fastening, bracing, for the stair construction, support and attachment to the work of other trades.

# C. Engineering Data Drawings

- Before any architectural stairs are fabricated, submit engineering data drawings to the Architect and Structural Engineer for review. The Contractor is responsible for the structural design and supports for the stair system and must show his proposed system on these drawings.
- 2. These drawings must show all load conditions and design calculations relative to connections, fastening devices and anchorage, as well as size and gauge of stair members. Calculations and drawings must be prepared by a Structural Engineer licensed in the State of Connecticut, and shall be signed and sealed by this Engineer.

## 1.6 SAMPLES SUBMISSION

A. Submit the following listed samples and other samples as may be requested by the Architect, to show the quality standards:

- 1. Exposed weld.
- 2. Exposed bolted connection.
- 3. Tread and stringer connection.
- 4. Glass tread.
- 5. Handrail with railing bracket.
- B. Samples shall be submitted cleaned and shop primed and shall represent standards to which all respective materials used in the Project shall meet.

#### 1.7 PERFORMANCE STANDARDS

- A. Stairs and railings shall be constructed to conform to the following performance standards, unless greater required by Code:
  - 1. Stairs and platforms shall support a live load of one hundred (100) psf and a concentrated live load of three hundred (300) lbs. and shall have a live load deflection limited to 1/360 of the span. Loads shall not apply simultaneously.
  - 2. Railings shall withstand a two hundred (200) lb. force applied to rail from any direction, and a uniformly distributed load of 50 lbs./lin. ft. applied downward or horizontally, loads not to act simultaneously.

# 1.8 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect architectural stair before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect and at no additional cost to the Owner.

# PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Steel and Iron: Comply with the following standards for the forms and types of steel for the required items of work.
  - 1. Steel Plates, Shapes and Bars: ASTM A 36.
  - 2. Gray Iron Castings: ASTM A 48, Class 30, unless another class is indicated or required by structural loads.

3. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

# B. Stainless Steel

- 1. Tubing: ASTM A 554, Grade MT 316L.
- 2. Pipe: ASTM A 312, Grade TP 316L.
- 3. Castings: ASTM A 743, Grade CF 8M or CF 3M.
- 4. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 316L.
- 5. Bars and Shapes: ASTM A 276, Type 316L.
- 6. Finish: All stainless steel shall have No. 4 brushed satin directional polish finish.
- C. Shop Primer for Ferrous Metal: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
- D. Bituminous Paint: Cold-applied asphalt mastic, ASTM D 1187.
- E. Glass Treads and Landings: Glass for stair treads shall be clear, low-iron, fully-tempered, and laminated, transparent and glazing quality conforming to ASTM C 1048 and ASTM C 1172. Multiply treads shall have a sacrificial top layer with slip-resistant surface. Basis of Design glass is Walker Glass with Walker Textures Pattern 406 top layer. Subject to compliance with requirements specified, other acceptable manufacturers are McGrory Glass Madras Flooring or Jockimo (Glass Grit top layer); 4-ply tread consisting of 3 structural layers with a sacrificial layer on the top.
  - 1. Anchoring and installation of the glass treads will be with clear structural adhesive. Provide sample submittal of material.
  - 2. Structural Performance: Glass treads shall be designed, engineered, and fabricated to provide live load capacity of (minimum) 100 pounds per square foot on a five foot span and a concentrated load of 300 pounds.
  - 3. Solid glass treads shall be standard, traffic-bearing, replaceable type glass.
  - 4. Laminated Glass: Low-iron, tempered glass lites of equal thickness interleaved with polyvinyl butyral (PVB) in configuration indicated.
    - a. Clear Tempered Glass: ASTM C 1048, Condition A (uncoated), Type I (transparent, flat), Class 1 (clear), Quality q3, Kind FT, minimum 1/4" thick.

- b. Fully tempered glass shall be heat soaked to EN 14179-1:2005-European Heat Soaking Standard.
- c. (Low-Iron) Glass: Class I (clear); with a minimum 91 percent visible light transmission.
- F. Stainless Steel Railings: As specified under Section 057000.
- G. Glass Guardrails: As specified under Section 057313.

## 2.2 FABRICATION

#### A. General

- Architectural steel stair work shall be fabricated by an experienced manufacturer in accordance with approved shop drawings and best practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand strains and stresses to which material will be subjected.
- 2. Fabricate shop assemblies in largest practical sizes to minimize field work. All exposed surfaces shall be clean and free from all dirt, stains, grease marks, scratches, waves, dents, buckles, tool marks, rattles, and other objectionable defects which mar appearance or use of finished work.
- 3. Cutting: Cut materials by sawing, shearing, or blanking. Flame cutting will be permitted when ground back to clean edges. Cuts shall be made accurately, clean, sharp and free of burrs, without deforming adjacent metals.
- 4. Connections: Make connections with tight joints, capable of developing full strength of the members, flush. Locate joints where least conspicuous. Use concealed fasteners where possible. Weld or rivet shop connections; bolt, screw or weld field connections.
  - a. Welding: Welds shall be continuous, except where spot welding is specifically permitted. Welding shall conform to the Standard Code of the American Welding Society. Exposed welds are required to be ground flush and smooth.
  - b. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts, or upset thread ends. Exposed bolts and screw head shall be flat and countersunk, unless otherwise indicated on drawings. Remove projecting ends of bolts and screws. Punch or drill holes; do not burn.

### B. Stairs and Platforms

- Provide steel plate stringers, guardrails and supports for treads and platforms matching profiles as shown. Weld carrier tabs to the steel plate stringers and guardrails.
- 2. On intermediate platforms, continue profile of stringers and guardrails. Miter and weld and grind smooth internal and external corners of steel plate stringers and guardrails.
- 3. At base of steel plate stringer and guardrail, provide steel angles anchored to concrete slab with countersunk anchors. Weld angles to stringer and guardrail. Connection of the stringers to the concrete slab shall be as detailed on the structural drawings. Connection will be a done in a trench in the slab with all attachment done below the finish floor surface.
- 4. Properly fit and securely fasten together all parts making exposed joints close fitting. Cut, drill, punch and tap as required for installation.
- 5. Make joints as strong and rigid as adjoining sections. Weld continuously along entire line of contact except where spot welding is indicated.
- 6. Give ferrous metal surfaces a shop coat of primer. Before painting, thoroughly clean surfaces with wire brushes or other proper and effective means of removing loose scale, filings or other objectionable materials.
- 7. Remove grease prior to painting. Separate dissimilar metals in or adjacent to work of this Section with a coat of bituminous paint on each surface prior to installation.
- 8. All surfaces of steel stringers, guardrails, brackets, connections, inserts, supports, etc. shall be shop primed to receive paint as specified in Section 099000.

## PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where architectural stairs are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

A. Work in the field shall comply with the same requirements as specified for shop work above.

- B. Provide connecting members needed for properly securing the work to drywall and structural framing as indicated on the structural drawings. Furnish built-in items to drywall trades as required for proper anchorage.
- C. Leave work exposed to view clean, smooth and neatly finished. All exposed welds shall be dressed smooth.
- D. Include supplementary parts necessary to complete each item even though such work is not definitively shown or specified.
- E. Coordinate and schedule the work of this Section with the work of other trades. Furnish anchors, sockets, fastenings and other miscellaneous items to be embedded in concrete or masonry, or required for securing metal work to other construction so as not to delay job progress.
- F. Install work plumb and true to the exact lines and levels, in the correct location and in proper relation to adjoining work.
- G. Touch up marred and abraded shop paint of exposed surfaces after erection in the field.

# 3.3 TOUCH-UP PAINTING

A. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop coat, and paint exposed areas with same material used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

**END OF SECTION** 

## PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ornamental glass rail system as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Glass guardrails as shown on drawings.
  - 2. Stainless steel handrails supported on glass guardrail panels.

3. Aluminum shoe with stainless steel cover.

# 1.3 RELATED SECTIONS

- A. Ornamental Metal Stairs Section 057100.
- B. Glass and Glazing Section 088000.

### 1.4 QUALITY ASSURANCE

- A. General: Work of this section shall be fabricated and installed by an experienced fabricator or manufacturer who has been engaged in work of equivalent scope and fabrication standards for at least five (5) years. Materials, methods of fabrication, fitting, assembly, bracing, supporting, fastening, operating devices, and erection shall be in accordance with drawings, specifications, and approved shop drawings, and be of highest quality practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled, and erected.
- B. Custom stainless steel fabrications shall be made by a single manufacturer who has a dedicated facility for the assembly, welding, and polishing of stainless steel. The manufacturer shall have dedicated tooling, fixtures, and machine tools used exclusively for the manufacture of stainless steel products, and which shall not be used for other metals, especially carbon steel.

#### 1.5 SUBMITTALS

- A. Shop Drawings: Submit for all items of work, at full scale as far as practical, showing metal and glass thicknesses, arrangement of components, of joining, of joining, details of all field connections and anchorages, diagrams and details explaining provisions for thermal movement, fastening and sealing methods, glazing methods, and support methods, metal finishes and all other pertinent information.
  - Engineering design and calculations for glass railing assembly see Article 1.7 herein.

# B. Samples - Submit

1. Glass, 12" x 12" for each type and thickness indicated.

## 2. Metal Finishes

- a. Submit finish samples, 6" x 6", for finish system specified.
- b. The samples submitted shall be representative of the workmanship and finishes of all work of this Section to be incorporated in the completed project.

3. Stainless Steel Handrail: Rail assemblies, 2'-0" long, to show end condition, mounting assemblies and typical tight joint and finish.

# 1.6 PRODUCT HANDLING

- A. Glass: At all times during transport, storage and handling of glass, provide cushions at glass edges to prevent damage. Protect glass faces from scratches and abrasion. Protect glass edges from chipping or other damage. Deliver each piece of glass with factory labels (indicating glass type, quality and thickness) and do not remove labels until installation has been approved.
- B. Glazing Materials: Deliver glazing materials in manufacturer's unopened containers, fully identified with trade name, color, size, hardness, type, class and grade. Store glazing materials where they will be free from damage in accordance with manufacturer's recommendations.
- C. Finished Materials: Protect finishes against soiling, staining or damage from scratches and abrasion. Maintain protection during construction until project completion or as otherwise directed by Architect.
  - 1. Provide wrappings, strippable coatings or other means approved by Architect.
  - 2. During construction, remove protection for visual observation of finish as directed by Architect and replace to maintain protection.

# 1.7 PERFORMANCE STANDARDS (UNLESS GREATER REQUIRED BY CODE)

- A. Glass railing assembly shall be designed and installed to resist the simultaneous application of a lateral force of 50 PLF and a vertical load of 100 PLF, both applied to the top of the railing. Railing shall resist a total lateral force and total vertical load of at least 200 lbs. each.
- B. Wind Load (for Exterior Glass Railings): For wind load requirements, see Structural Drawings.
- C. Submit calculations and drawings signed and sealed by a Professional Engineer licensed in the State of Connecticut indicating that glass railing system can meet these performance criteria.

# PART 2 PRODUCTS

#### 2.1 MATERIALS

A. Provide materials which have been selected for their surface flatness, smoothness, and freedom from surface blemishes where exposed to view in the finished unit. Surfaces exposed to view that exhibit pitting, seam marks, roller marks, oil-canning, stains, discolorations, or other imperfections on the finished units will not be acceptable.

- B. Manufacturer: Blumcraft, Livers Bronze Co. Inc., C.R. Laurence, or approved equal.
- C. Aluminum: Comply with the following standards for the forms and types of aluminum for the required items of work:
  - 1. Alloy and Temper: Provide alloy and temper as indicated or as otherwise recommended by the aluminum producer or finisher for type of use and finish indicated, and with not less than the strength and durability properties specified in ASTM B 221 for 6063-T5; minimum thickness of 0.125".
  - 2. Finish: Aluminum to have mill finish with bituminous coating to separate it from dissimilar metals.
- D. Stainless Steel: Comply with the following standards for the forms and types of stainless steel for the required items of work:
  - 1. Type: AISI Type 304 (interior) and Type 316 (exterior), unless otherwise indicated.
  - 2. Tubing: ASTM A 554; minimum wall thickness of 0.050"; thicker if required to meet performance standards specified herein.
  - 3. Finish: All stainless steel shall have No. 4 satin directional polish finish.
- E. Laminated, Tempered Glass: ASTM C 1172, Condition A (uncoated), Type I (transparent flat glass), Kind LT (laminated tempered), Class 1 (clear), low iron, Quality-Q3 with clear, polyvinyl butyral interlayer not less than 0.060" thick.
  - 1. Thickness shall be 1/2".
  - 2. Exposed Edges: Arrised edge (1/16"), ground smooth and polished.
  - 3. Sealed Edges: Arrised edge (1/16") and ground.
- F. Glazing and Sealing Materials
  - 1. Neoprene Setting Blocks: Solid 70 to 90 Shore A hardness, size to suit condition.
  - 2. Neoprene Wedges and Spacers: Solid 50 Shore A hardness, size to suit condition.
  - 3. Neoprene Cushions and Gaskets: Closed cell sponge, 20 to 30 Shore A hardness, size to suit condition.
  - 4. Epoxy Adhesive: Pourable, non-shrinking, 70 to 80 Shore A hardness, formulated to suit glazing conditions and stress conditions.
  - 5. Sealant: One-part silicone, sealant, 20 to 30 Shore A hardness, clear or custom color as selected by Architect. Basis of Design: Silicone Sealant 1200 by General Electric. Subject to compliance with requirements specified, other acceptable

manufacturers are Dow Corning and Sika. Sealant primers and backing as and if recommended by sealant manufacturer.

- G. Protection for Metals: Bituminous paint conforming to FS TT-C-494.
- H. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of the metal to be welded, and as required for color match, strength and compatibility in the fabricated items.
- I. Fasteners: Furnish of basic metal and alloy, matching finished color and texture as the metal being fastened, unless otherwise indicated. Unless otherwise shown, provide Phillips flat-head screws for exposed fasteners.

## 2.2 WORKMANSHIP

- A. General: Materials, methods of fabrication, fitting assembly, bracing, supporting, fastening, and erection shall be in accordance with drawings and specifications, approved shop drawings, and of the <u>highest quality</u> practices of the industry, using new and clean materials as specified, having structural properties sufficient to safely sustain or withstand stresses and strains to which materials and assembled work will be subjected. All work shall be accurately and neatly fabricated, assembled and erected.
- B. Connections: Make connections with tight joints, capable of developing full strength of member, flush. Locate joints as approved by Architect. Provide connections to allow for thermal movement of metal at locations and by methods approved by Architect. For work exposed to view, use concealed fasteners with joints accurately fitted, flush and rigidly secured with hairline contacts.
  - Welding: Welding shall be in accordance with recommendations of the American Welding Society and shall be done with electrodes and/or methods recommended by the manufacturers of the metals being welded. Welds shall be continuous, except where spot welding is specifically permitted. Welds exposed to view shall be ground flush and dressed smooth with and to match finish of adjoining surfaces so that joint will not be visible; undercut metal edges where welds are required to be ground flush and dressed smooth. All welds on or behind surfaces which will be exposed to view shall be done so that finished surface will be free of imperfections such as pits, runs, splatter, cracks, warping, dimpling, depressions or other forms of distortion or discoloration. Remove weld splatter and welding oxides from all welded surfaces.
  - 2. Bolts and Screws: Make threaded connections tight with threads entirely concealed. Use lock nuts. Bolts and screw heads, where shown to be exposed to view, shall be flat and countersunk. Cut off projecting ends of exposed bolts and screws flush with nuts of adjacent metal.
- C. Built-In Work: Furnish anchor bolts, inserts, plates and any other anchorage devices, and all other items for architectural metal work to be built into concrete, masonry, or

- work of other trades, with necessary templates and instructions, and in ample time to facilitate proper placing and installation.
- D. Supplementary Parts: Provide as necessary to complete each item of work, even though such supplementary parts are not shown or specified.
- E. Coordination: Accurately cut, fit, drill and tap work of this Section to accommodate and fit work of other trades. Furnish or obtain, as applicable, templates and drawings to or from applicable trades for proper coordination of this work.
- F. Exposed Work: In addition to requirements specified herein or shown on drawings, all surfaces exposed to view shall be clean, and free from dirt, stains, grease, scratches, distortions, waves, dents, buckles, tool marks, burrs and other defects which mar appearance of finished work. Ornamental metal work exposed to view shall be straight and true to line or curve, smooth arrises and angles as sharp as practicable, miters formed in true alignment, profiles accurately intersecting, and with joints carefully matched to produce continuity of line and design. Exposed fastenings, where permitted, shall be of the same material, color and finish as the metal to which applied, unless otherwise indicated, and shall be of the smallest practicable size.
- G. Materials used shall be of such strength, thickness and alloy that they are capable of meeting all standards and descriptions specified herein and as detailed on drawings.

#### 2.3 FABRICATION

- A. Tolerance: Unless otherwise indicated herein, all work of this section shall be plumb, square, level, and correctly aligned within the following limitations:
  - 1. Offset from true horizontal, vertical, and design locations shall not exceed 1/8" per 10' of length for any component, not cumulative.
  - 2. Maximum offset from true alignment between abutting components shall not exceed 1/32".

## PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where ornamental rail assemblies are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

# 3.2 INSTALLATION

A. General: Install work of this Section square, plumb, straight, true to line or radius, accurately fitted and located, with flush, tight hairline joints (except as otherwise indicated or to allow for thermal movement), with provisions for other trades, with

provisions to allow for thermal movement, and with attachment devices as required for secure and rigid installation. It is the responsibility of the architectural metal erector to assure himself that shop fabricated architectural metal items will properly fit the field condition. In cases where the shop fabricated architectural metal items do not fit the field condition, the item shall be returned to the shop for correction.

#### B. Attachments

- 1. Unless otherwise indicated, work to be built into concrete or masonry shall be anchored with shop welded on galvanized steel strap anchors; work to be attached to concrete or masonry shall be anchored by bolts into embedded non-corrosive metal inserts or expansion shields; work attached to structural steel shall be anchored by welds or bolts; work attached to metals other than structural steel shall be anchored by bolts or screws. Power actuated fasteners not permitted unless approved by Architect.
- All attachment devices shall be of type, size and spacing to suit condition and as approved by Architect. Provide shims, slotted holes, or other means necessary for leveling, plumbing and other required adjustments. Attachment devices for work exposed to view shall be concealed, unless indicated otherwise.
- Do all necessary drilling, tapping, cutting or other preparations of surrounding construction in the field accurately, neatly and as necessary for the attachment and support of work of this Section, but obtain Architect's approval prior to such preparation to work of others.

### 3.3 CLEANING, PROTECTION AND ADJUSTMENT

- A. Cleaning and Protection: The Contractor shall protect all work for misuse or damage after installation has been completed. Work which is scratched, etched or damaged will not be accepted by Owner, and shall be replaced with acceptable work. Work shall also be protected against soiling, etching or other contamination. This work shall be done at no additional cost to Owner.
  - 1. The Subcontractor shall be responsible for all breakage of glass whatever the cause until the building is turned over to the Owner. He shall replace all broken glass and deliver the entire building with all glazing intact and clean.
  - 2. Acceptance of building by the Owner shall not take place until all glass has labels removed, is washed and polished, both sides, by a window cleaner specializing in such work.

**END OF SECTION** 



### **PART 1 GENERAL**

## 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the carpentry work as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Blocking and miscellaneous wood.
  - 2. Plywood backing panels for telephone and electrical closets.
  - 3. Rough hardware.

- 4. Installation only of finish hardware.
- 5. Installation only of doors and hollow metal frames.
- 6. Stage flooring.

#### 1.3 RELATED SECTIONS

- A. Architectural Woodwork Section 064023.
- B. Roofing Section 075416.
- C. Steel Doors and Frames Section 081113.
- D. Wood Doors Section 081416.
- E. Finish Hardware Section 087100.
- F. Painting and Finishing Section 099000.

### 1.4 QUALITY ASSURANCE

- A. Lumber Standard: Comply with PS 20.
- B. Plywood Standard: Comply with PS 1 and American Plywood Assoc. (APA).
- C. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.
- D. Grade Marks: Identify lumber and plywood by official grade mark.
  - Lumber: Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.
    - a. S-Dry: Maximum nineteen (19) percent moisture content as per ASTM D 2016.
- E. Installation of doors, frames and hardware shall conform to the minimum standards of "Installation Guides for Doors and Hardware" of the Door and Hardware Institute.

#### 1.5 SUBMITTALS

- A. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.
- B. Fire-Retardant Treatment: Include certification by treating plant that treatment material complies with governing ordinances and that treatment will not bleed through finished surfaces.
- C. Samples of all components of stage flooring including slip sheet, resilient pads, and fasteners.

### 1.6 PRODUCT HANDLING

- A. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in an area protected from the elements.
- B. Deliver rough hardware in sealed kegs and/or other containers which shall bear labels as to type and kind.
- C. Pile lumber for rough usage, when delivered to the site in stacks to insure drainage and with a minimum clearance of six (6) inches above grade. Cover stacks with tarpaulins or other watertight coverings. Store grounds and similar small sized lumber inside the building as soon as possible after delivery.
- D. Do not store seasoned lumber in wet or damp portions of the building.
- E. Protect fire retardant treated materials against high humidity and moisture during storage and erection.
- F. Remove delivered materials which do not conform to specified grading rules or are otherwise not suitable for installation from the job site and replace with acceptable materials.
- G. All items specified in Section 087100 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.
- H. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.

## 1.7 JOB CONDITIONS

- A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and the Architect.
- B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.
- C. Stage Flooring Mock Up: Provide a 5' x 5' on site mockup of the stage flooring assembly complete with all components including wall base. Mockup to be reviewed and approved by project architect prior to proceeding with the balance of the stage flooring. Mockup can be incorporated into the stage flooring once accepted by project architect.

### PART 2 PRODUCTS

### 2.1 WOOD MATERIAL

A. General

- 1. All wood shall be sound, flat, straight, well seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.
- 2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of nineteen (19) percent. Wood shall be S4S, S-Dry, complying with PS-20.
- 3. Plywood and rough carpentry for telephone and electrical closets, provide 3/4" thick C-D EXT-APA plywood, fire retardant treated as specified herein.

#### B. Wood Treatment

- 1. All interior wood material specified herein shall be fire retardant treated to comply with the AWPA standard U1 to achieve a flame spread rating of not more than 25 (UL Class "FRS") when tested in accordance with UL Test 723 or ASTM E 84. The fire retardant chemicals used to treat the lumber must comply with FR-1 of AWPA Standard P49 and be free of halogens, sulfates and ammonium phosphate.
  - a. After treatment, kiln dry to a moisture content of fifteen (15) percent; if wood is to be painted or finished, kiln dry to a moisture content of twelve (12) percent. Provide UL approved identification on treated materials.
- For exterior blocking, roofing and sheet metal, pressure treat wood with copper azole, Type B (CA-B); ammoniacal copper quat (ACQ) or similar preservative product that contains no arsenic or chromium. Preservative shall comply with AWPA Standard U1, (.25 lbs./cubic foot of chemical in wood).
  - a. After treatment, kiln dry to a maximum moisture content of fifteen (15) percent.
- 3. Treated wood which is cut or otherwise damaged shall be further treated in accordance with the AWPA Standard M-4.

#### 2.2 HARDWARE

- A. Rough Hardware for Treated Woods and Exterior Use: Hot-dipped galvanized or Type 304 stainless steel.
- B. Nails: Common steel wire, untreated for interior work as per ASTM F 1667.
- C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:
  - 1. Bolts: ASTM A 307, Grade A.
  - 2. Nuts: ASTM A 563.
  - 3. Lag Screws and Bolts: ASME B 18.2.1.

- D. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
  - Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn
     5.
  - 2. Material for Treated Woods and Exterior Use: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2.
- E. Wood Screws: ASME B 18.6.1.
- F. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Architect.
- G. Resilient Pads at Stage Flooring: Neoprene pads with a 40-50 durometer rating that can accept a distributed live load of 150 psf. VMC/Korfund "Maxi-Flex E-Z Cut" standard black pad, Robbins "Biopad Inverted Conical pad" or Mason Industries Inc. "Super W" Standard pad.

### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where carpentry is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION OF FINISH HARDWARE

- A. Hardware shall be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.
- B. Unless otherwise noted, mount hardware units at heights established in Section 081113.
- C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.
- D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- E. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

- F. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.
- G. All keys used shall be construction keys which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys shall be returned to the Owner.

# H. Adjusting and Cleaning

- Adjust and check each operating item of hardware and each door, to ensure proper
  operation and function of every unit. Lubricate moving parts with type lubrication
  recommended by manufacturer (graphite type if no other recommended). Replace units
  which cannot be adjusted and lubricated to operate freely and smoothly as intended for the
  application made.
- 2. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

### 3.3 INSTALLATION OF DOORS AND FRAMES

### A. Preparation

- 1. Remove welded-in shipping spreaders installed at factory.
- Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:
  - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
  - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
  - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
  - d. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.
- 3. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.
- B. Installation

- General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
- Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.
  - a. Install frames in accordance with ANSI 250.11-20001, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein
  - b. At fire-protection-rated openings, install frames according to NFPA 80.
  - c. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
  - d. Install frames with removable glazing stops located on secure side of opening.
  - e. Frames set in masonry walls shall have door silencers installed in frames before grouting.
  - f. Remove temporary braces necessary for installation only after frames have been properly set and secured.
  - g. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
- 3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.
  - a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.
- 4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames conforming to the requirements of Section 072100, "Thermal Insulation."
- 5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar; refer to Section 042000 "Unit Masonry" for installation of frames in masonry walls.
- 6. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- 7. In-Place Gypsum Board Partitions: Secure frames in place with post-installed expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
- 8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting

- construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.
- 9. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.
- 10. Steel Doors: Fit hollow metal doors accurately in frames to the tolerances given in HMMA 841 of ANSI/NAAMM, current edition.
  - a. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
- 11. Glazing: Comply with installation requirements in Division 8 Section "Glass and Glazing" and with standard steel door and frame manufacturer's written instructions.
  - a. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

#### C. Wood Doors

- 1. Condition doors to average prevailing humidity in installation area prior to hanging.
- 2. Install doors in accordance with manufacturer's instructions.
- 3. Fit door to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge.
- 4. Clearances: Install doors to meet clearance requirements specified in Section 081416.
- 5. Fire-Rated Doors: Install in corresponding fire-rated frames in accordance with the requirements of NFPA No. 80. Provide clearances complying with the limitations of the authority having jurisdiction.
- D. Adjustments: Check and readjust operating finish hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

#### 3.4 BLOCKING AND MISCELLANEOUS WOOD

#### A. General

- 1. Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.
- 2. Shim where required to true up furring, blocking and the like. Use wood or metal shims only.
- 3. Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.

## B. Blocking and Miscellaneous Wood

- Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc., that may
  be necessary and required in connection with the carpentry and with the work described for
  any other trades and including required carpentry for electrical fixtures. All blocking and
  nailers shall be continuous wherever required, whether or not so indicated.
- Blocking shall be as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., shall be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.
- 3. Fastening for wood grounds, furring and blocking shall be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs, inserts or similar fastenings shall be used, of suitable type and size to draw the members into place and securely hold same.

# C. Rough Lumber for Roofing and Sheet Metal

- 1. Furnish and install all wood nailing strips and wood blocking required in connection with respective types of roofing, fans, flashings, and sheet metal work, using preservative treated wood as herein before specified.
- 2. Wood blocking shall be of sizes and shapes as indicated on the drawings and/or designed for the reception of curb flashings for roof ventilators and similar items.
- 3. All nailing strips and blocking shall be carried out in accordance with the printed installation instructions, and/or recommendations of the accepted manufacturer of the roofing materials, and in coordination and cooperation with the sheet metal work trades.
- 4. All blocking and nailing strips shall be firmly secured in place using counter bored bolt and nut fastenings, or secured by any other proposed flush surfaced fastenings.
- 5. Wood nailing strips or blocking required to be embedded in concrete work shall be furnished in time due for placing, prior to start of concrete operations. Locations and spacings of nailing strips or blocking shall be performed in coordination with the concrete trades, as required for respective installations.

# 3.5 TELEPHONE AND ELECTRICAL EQUIPMENT MOUNTING BOARDS

- A. Furnish and install 3/4" thick plywood panels to the walls of the telephone and electrical equipment rooms in accordance with the requirements of the local utility company.
- B. Secure to wall using proper devices for substrates encountered, spaced twelve (12) inches o.c., maximum around the edges, 1-1/2" from corners, and in three (3) rows of three (3) each in the field. Recess fastening devices flush with the plywood surface. Adjacent panels shall be butted with 1/16" space between without lapping.

### 3.6 ROUGH HARDWARE

- A. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and the Contract Documents.
- B. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.
- C. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than sixteen (16) inches apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than sixteen (16) inches apart.
- D. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surfaces and peen as may be required to receive finished work.
- E. Inserts to secure wood nailers to concrete shall be malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding thirty (30) inches o.c.
- F. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.
- G. Detailed instructions with sketches of necessary requirements, shall be given to the masonry trade showing the location and other details of such nailing devices.

# 3.7 CLEANING UP

A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.

### B. Sweeping

- 1. At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.
- 2. Remove the refuse to the area of the job site set aside for its storage.
- 3. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

**END OF SECTION** 

## PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural woodwork as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Wood paneling.

- Wood trim, moldings, base, and door frames.
- 3. Wood millwork and counters with wood veneers.
- 4. Wood millwork and counters with plastic laminate finish.
- 5. Hardware for architectural woodwork.
- 6. Wood shelving.
- 7. Wood banquettes, upholstered.
- 8. Solid surfacing material countertops.
- 9. Wood framing and rough lumber as required for work of this Section.
- 10. Wood grounds, blocking, nailers, furring as required for work of this Section.
- 11. All rough hardware and fastenings for work of this Section.
- 12. Drilling concrete and masonry, drilling and/or tapping metal work, as required, for the installation of work of this Section.
- 13. Back painting as specified herein.
- 14. Shop finish of work of this Section, except items indicated herein to be shop primed only.

### 1.3 RELATED SECTIONS

- Carpentry Section 062000.
- B. Caulking between architectural woodwork and any wall, floor, or ceiling joints Section 079200.
- C. Wood Doors Section 081416.
- D. Field finishing of architectural woodwork Section 099000.

#### 1.4 QUALITY STANDARDS

- A. The quality standards of the Architectural Woodwork Institute, "Architectural Woodwork Standards" (AWS), 1<sup>st</sup> Edition, dated October 1, 2009, shall apply to all workmanship, including materials and installation, for architectural woodwork, and by reference are made a part of this specification. All work shall conform to "Premium" grade requirements of the AWS unless otherwise modified herein.
- B. In the event of a dispute as to the quality grade (or grades), the Contractor shall call upon the Architectural Woodwork Institute for an inspection under AWI's Quality

Certification Program which shall include a QCP Inspection and Report. The Contractor agrees to abide by the decision of this Report. The cost of said inspection and report shall be borne by the Contractor.

- Employ only tradesmen experienced in the fabrication and installation of architectural woodwork.
- D. Woodworking firm must be accredited by the AWI Quality Certification Program (QCP).

# 1.5 SUBMITTALS

# A. Shop Drawings

- Submit shop drawings of all woodwork specified and indicated on the drawings. Shop drawings shall indicate room plans and elevations at 3/4" equals 1'-0" scale and typical construction details at 3" equals 1'-0" scale. Shop drawings shall indicate all materials, thicknesses and finishes.
- 2. Shop drawings shall show all finish hardware, anchors, fastenings and accessories.
- 3. Shop drawings shall show all jointing, joint treatment and butt jointing in veneers and plastic laminate.
- 4. Shop drawings for wood paneling must show complete elevations of rooms to receive paneling as well as panel matching required by these specifications.
- 5. Shop drawings for cabinet work must show centerline height and horizontal location of all required internal wall blocking.
- 6. Where architectural woodwork deviates from AWI standards noted herein, shop drawings must identify these deviations.
- B. Samples: Submit samples of each of the following items:
  - 1. Plastic laminate, twelve (12) inches square, including a section of outside corner.
  - 2. Transparent finish for each species of wood veneer laminated to particleboard, twelve (12) inches square, for each finish specified or shown.
  - 3. Each finish type of wood panel, 24" wide x 36" high.
  - 4. Each type and finish of each type of wood cornice, trim, molding, etc., eight (8) inches long, finish as specified.
  - 5. Cabinet hardware.
  - 6. Acrylic surfacing finish.

- 7. Decorative metal inserts in woodwork.
- 8. Edge banding for surfaces.
- 9. Metal table legs.
- 10. Banquette seat materials: foam and fabric.
- 11. Curved aluminm grille at theater stage apron.

### 1.6 QUALIFICATIONS

A. The work of this Section shall be provided by a firm having a minimum of five (5) years' experience on projects of similar size and quality to that specified and shown.

### 1.7 COORDINATION

- A. Coordinate the work of this Section with other appropriate Sections of the specifications to insure proper scheduling for fabrication and installation of the work specified herein.
- B. Coordinate with partition and finish trades to insure that proper provisions are made for the installation of the work specified herein.
- C. Verify all dimensions in the field prior to fabrication of all Architectural Woodwork to assure proper fit.

# 1.8 PRODUCT HANDLING

- A. All materials and work of this Section shall be protected from damage from time of shipment from shop to final acceptance of work. Cover, ventilate, and protect work of this Section from damage caused by weather, moisture, heat, staining, dirt, abrasions, any other causes which may adversely affect appearance or use, or which may cause deterioration of finish, warping, distortion, twisting, opening of joints and seams, delamination, loosening, etc., of work of this Section.
- B. Keep all finish carpentry, millwork, and cabinet work under cover both in transit and at the premises. Do not deliver any finish carpentry, millwork or cabinet work before it is required for installation. Protect such work to avoid damage in transit, during erection and after erection until acceptance of the building; use all such methods to provide the proper protection. Remove such protection when directed by the Architect.
- C. Deliver finish carpentry, millwork, and cabinet work in a dry stable condition; protect same against injury and dampness. Do not store or install finish carpentry, millwork or cabinet work until after the concrete, masonry and plaster work are thoroughly dry.
- D. Damaged or defective items of work of this Section are subject to rejection and replacement with new by Contractor, at no cost to Owner.

### 1.9 JOB CONDITIONS

- A. Humidity Controls: The ambient relative humidity at the site, including both the storage and the installation areas, shall be maintained between 25% and 55% prior to delivery and through the life of the installation.
- B. Determine equilibrium moisture content and maintain required temperature and relative humidity as required for a tolerance of plus or minus one (1) percent of the specified optimum moisture content until woodwork receives specified finishes. Refer to "Guide to Wood Species Selection," AWI, for method of determining equilibrium moisture content values.
- C. Examination of Substrate and Conditions: The installer must examine the substrate and the conditions under which the work of this Section is to be performed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- D. Areas to receive architectural woodwork must be fully enclosed with windows and/or curtain wall installed and glazed, exterior doors in place, HVAC systems operational, and temporary openings closed. Any plaster, wet grinding and concrete work shall be fully dry.
- E. Architectural woodwork shall be allowed to come to equilibrium on site for 7 days prior to installation.

### PART 2 PRODUCTS

# 2.1 BASIC REQUIREMENTS

- A. Wood Moisture Content: Provide kiln-dried (KD) lumber with an average moisture content range of nine (9) to twelve (12) percent for exterior work and six (6) to eleven (11) percent for interior work.
- B. Measurements: Before proceeding with woodwork required to be fitted to other construction, obtain field measurements and verify all dimensions of shop drawing details as required for accurate fit.
- C. Compatibility of Grain and Color: Architect reserves the right to select materials for best compatibility between visually related members and veneers.
- D. Machine and sand woodwork to comply with requirements of Standards for specified grade.
- E. Fabricate woodwork to dimensions, profiles and details shown. Rout or groove back of flat trim members, kerf backs of other wide flat members except plywood or veneered members.

- F. Miter joints by joining, splining and gluing to comply with requirements for the specified grade.
- G. Inspect each piece of lumber and plywood or each unit of woodwork after drying; do not use twisted, warped, bowed or otherwise damaged or defective wood.

# 2.2 GENERAL - MATERIALS

- A. Softwood lumber shall conform to the requirements of the latest edition of American Lumber Standards Simplified Practice Recommendation R-16. Grades shall conform to the grading rules of the Association having jurisdiction, and shall bear the official grade and trademark of the Inspection Bureau of the Association and a mark of mill identification.
- B. Framing and Rough Lumber: No. 1 KD grade Southern Pine or Dense Construction grade Douglas Fir, having extreme fiber in bending stress of at least 1700 psi, surfaced four sides (S4S). Provide fire retardant treatment meeting requirements of Section 062000.
- C. Grounds, Blocking, Nailers, Furring: Southern Pine, Douglas Fir or Sitka Spruce, grade to suit particular purpose and to be straight, square edged, straight grained, surfaced four sides (S4S), and which will retain nails and screws without splitting. Provide fire retardant treatment.
- D. Lumber: AWS Section 3 with the following requirements:
  - 1. Hardwood for Transparent Finish: Premium Grade, quarter sawn, select, clear white oak cut to match adjoining veneers, unless otherwise shown or specified, and free from cat's eyes, bird's eyes, burls, curls or cross grains.
  - 2. Hardwood for Opaque Finish: Any hardwood which, when finished, will not show any grain, imperfection or other surface defects when used with the opaque finish specified.
- E. Plywood: AWS Section 4; veneer core, particleboard or plywood core unless otherwise specified, and with the following requirements:
  - 1. Hardwood: Premium Grade, rift cut, select, clear white oak, face grade AA using minimum 6" leaves.
  - 2. Particleboard: Premium Grade, fire retardant for wall paneling. In addition, particleboard and MDF shall be certified to the following EPP CPA 3-08 formaldehyde emission limits:
    - a. Particleboard meets 0.18 ppm.
    - b. MDF meets 0.21 ppm.
  - 3. Edges: Banded with hardwood, vinyl or solid surfacing.

### F. Veneers

- Face Veneers for Transparent Finish: AWS Premium Grade, rift cut, select, clear white oak, face grade AA using minimum 6" leaves. Veneer must be flitch matched, sequence matched, book matched, end matched and centered balanced.
- 2. Face Veneers for Opaque Finish: Any closed grain hardwood veneer that, when finished, will not show grain, imperfection or other surface defects when used with the opaque finish specified.

# G. Finishing (Wood)

- 1. Transparent Finish
  - a. AWI Factory Finish System "Conversion Varnish, System 5, Transparent."
  - b. AWI Premium Grade.
  - c. Stain: As selected by the Architect.
  - d. Degree of Sheen: Dull satin.
  - e. Filled or Unfilled Finish.

# 2. Opaque Finish

- a. AWI Factory Finish System "Conversion Varnish, System 5, Opaque."
- b. AWI Premium Grade.
- c. Degree of Sheen: Satin.
- d. No grain to show.

# 2.3 PLASTIC LAMINATE

- A. Face Sheets: NEMA Publication LD3, Grade GP50, Type I, 0.05" thick, as manufactured by Abet Laminati, Formica, WilsonArt. Color, pattern and finish as selected by the Architect.
- B. Backing Sheets: Non-decorative, high-pressure plastic laminate, NEMA LD3, Grade BK20, 0.02" thick.
- C. Edges: Finish with plastic laminate to match face and applied before face sheets are applied, unless otherwise shown or specified.

#### 2.4 METAL

# A. Steel

- 1. Structural Steel Shapes and Plates: ASTM A 36.
- 2. Hot-Rolled Carbon Steel Sheets: Commercial quality, ASTM A 569, may be used for concealed parts only. Galvanize sheets for planters.

B. Primer for Unexposed Metal: Zinc chromate primer.

### 2.5 GLASS

A. Glass used in architectural woodwork shall be low-iron tempered, complying with the requirements of Section 088000.

# 2.6 MISCELLANEOUS PRODUCTS

#### A. Fasteners

- 1. Wood Screws: FS FF-S-111, type, size, material and finish as required for the condition of use.
- 2. Nails: FS FF-N-105, type, size, material and finish as required for the condition of use.
- 3. Anchors: Type, size, material and finish as required for the condition of use.
- 4. Staples: Upholstery type staples of sufficient strength to hold fabric taut in place without sagging.

### B. Adhesives

- 1. For Laminating Plastic Laminate Surfaces: Urea resin, Type II, as recommended by fabricator.
- 2. For Acrylic Sheets: Clear wood glue, water-based glue, or as recommended by the manufacturer of acrylic sheet.
- 3. For All Other Uses: Polyvinyl acetate resin emulsion or other type as recommended by the fabricator.
- C. Solid surfacing sheet, 1/4" thickness, Basis of Design: Porcelanosa Krion Black Metal 6901. Subject to compliance with requirements specified other acceptable manufacturers are Dupont Corian in Deep Nocturn, or Avonite Surfaces in Eclipse.
- D. Foam for cushions.
- E. Fabric for upholstering the seats of the baquettes.
- F. Stainless steel metal trim for cabinets, banquettes.
- G. Steel legs with integral leveling Basis of Design: Doug Mockett TL27P3, 3" diameter legs with plate leveler, in matte black finish. Subject to compliance with requirements specified, other acceptable manufacturers are Heidelberg Table Leg 3" diameter in matte black (620.70.19) orTable Legs on Line 4 1/2" diameter matte black (F35352).

H. Continuous, convex curved aluminum grill at Theater stage apron: AG10 Bar Grille by Architectural Grille (1-800- 387-6267). Powder coated finish in RAL color selected by architect. Provide grille core with tabs for attaching grille to stage apron framing

#### 2.7 CABINETS WITH PLASTIC LAMINATE FINISH

#### A. General

- 1. Fabricate all cabinetry and millwork to the "Premium Grade" standards of the AWS, Section 10.
- 2. Face construction of cabinets shall be "Flush Overlay."
- 3. Provide 3/4" thick doors, drawer fronts and fixed panels (including thickness of plastic) except where required to be thicker by Standards; and provide flush units.
- 4. Provide dust panels of 1/4" thick plywood or tempered hardboard above compartments and drawers, except where located directly below countertops.
- 5. Exposed Edges: Plastic laminate matching exposed panel surfaces. Ease exposed edge of overlap sheet.

#### B. Plastic Laminate

- 1. Plastic Laminate for Horizontal Surfaces: 0.050" thick, general purpose type (high pressure).
- 2. Plastic Laminate for External Vertical Surfaces: 0.028" thick, general purpose type (high pressure).
- 3. Plastic Laminate for Post Forming: 0.042" thick, post forming (high pressure).
- 4. Plastic Laminate for Cabinet Linings: 0.020" thick, cabinet liner (high pressure).
- 5. Plastic Laminate for Concealed Panel Backing: 0.020" thick, backer type (high pressure).
- 6. Plastic Laminate Colors and Patterns: As selected by the Architect from manufacturer's standard satin finish products.
- C. Shop Assembly: All work shall be shop assembled. Work that is too large for entrance into the use area shall be fabricated in attachable sections with provisions for reconnection in the using space.
- D. Material Thicknesses: See drawings for general material thicknesses. Minimum thickness of solid lumber for web frames, trim, bases, etc., shall be 3/4". Minimum thickness of plywood and particleboard shall be 3/4".

- E. Sizes: See drawings for woodwork sizes required. The manufacturer shall check field dimensions and verify all openings and actual field conditions prior to fabrication of work.
- F. Manufacturer is responsible for rigidity and structural stability.

## 2.8 PLASTIC LAMINATE COUNTERTOPS AND VANITIES

A. Grade: Same as AWS grade required for cabinet work; plastic laminate finish.

#### B. Construction

- 1. Provide back-splash and end-splash, where detailed; top-mounted square butt joint, fully covered with matching plastic laminate, eased edges.
- 2. Exposed Counter Edges: Plastic laminate matching surface, except as otherwise indicated. Ease exposed edges of overlap sheet.
- 3. Cut openings for equipment to be installed. Comply with equipment manufacturer's requirements, but provide internal corners of 1/8" minimum radius. Smooth saw cut and ease edges.
- 4. Seal cut edges of counter at openings for sinks and other "wet" equipment, using waterproofing compound recommended by plastic manufacturer and compatible with laminating adhesive.

## 2.9 BUILT-IN CABINETS, WOODWORK WITH WOOD VENEER FINISH

- A. Construction: Details of cabinet and wood work construction shall conform to design as detailed on the drawings and shall be constructed in accordance with AWS Section 10, Premium Grade.
- B. Finishing: All work shall be factory pre-finished. No field finishing will be permitted, except minor retouching that is necessary after installation to leave work in perfect condition. Field touch-up shall be accomplished using the same finishes as originally applied at the factory. All finishes shall be free from runs, sags and other visual defects. All wood shall be thoroughly hand smoothed and hand sanded to remove all traces of machine and tool marks. All steel or other metal components shall be deburred, thoroughly cleaned and degreased prior to finishing. Requirements for surface preparation shall be in accordance with AWI Standards specified. Surfaces shall be finished as follows:
  - 1. Wood veneers shall be as specified herein, flitches to be selected by Architect. Veneer shall be minimum 1/28" thick.
  - 2. All wood veneer surfaces shall be given transparent finish as specified herein.

- Backing Veneer: Provide backing veneer, of same thickness and strength as face veneer for balanced construction, where plywood surface not exposed, not semiexposed, or not to be finished. Note that interior surface of cabinets, closets, are to be finished.
- C. Edge Banding: All visible edges of case and body members fabricated from plywood shall be banded. Transparent finished wood veneer panels shall be banded with wood species to match face veneers.

#### 2.10 HARDWARE

- A. Architectural Woodwork Hardware: Provide the following items, as required:
  - 1. Hinges: European concealed hinges.
  - 2. Catches: Magnetic; top and bottom.
  - 3. Pulls: Hafele 4" Satin Stainless Steel Wire pulls.
  - 4. Locks: Directed by the Architect.
  - 5. Drawer Slides: Soft touch full extension, 100 lb. capacity.
  - 6. Shelf Supports: Pin and grommet system sized to accommodate shelving.
  - 7. Finish: Satin Stainless Steel.
- B. Closet Hardware: Oval wardrobe rails, chrome plated steel with center bracket and wall support brackets.
- C. Other Hardware
  - 1. Accurate Lock and Hardware
    - a. 2002 Flush Pulls
    - b. 2002CPDL Combination Pocket Door Lock
    - c. 2002CPDS Combination Pocket Door Pull
  - 2. Hafele Flush Bolt and dust socket
  - 3. Mockett GRN1 Grommet
  - 4. Sugatsune Recessed Mount Sliding Door Hardware SDR-RA80-RM
  - 5. Sugatsune 4" Wire Pulls SWP Series Satin Stainless Steel

## 2.11 WOOD FOR RAILS, CAPS, TRIM, BASES, MOLDINGS AND FRAMES

- A. Quality Standard: For the following types of interior architectural woodwork, comply with indicated standards as applicable.
  - 1. Standing and Running Trim: AWS Section 6.
  - 2. Miscellaneous Millwork: AWS Section 6.
- B. Wood Work for Transparent Finish: Except as otherwise indicated, comply with the following:
  - 1. Grade: Premium.
  - 2. Species of Solid Wood: Quarter Sawn Species as noted on drawings.
- C. Woodwork for Paint Finish: Except as otherwise indicated, comply with the following:
  - 1. Grade: Premium.
  - 2. Species of Solid Wood: Solid, paint grade, sound clear Poplar or Birch.

## 2.12 HARDWOOD VENEERED PLYWOOD PANELS

- A. Type: Interior grade, hot press laminated with waterproof adhesive, pre-finished, with face veneers and core construction as specified herein, meeting AWS Section 8 standards.
- B. Core Construction: Shall be fire retardant treated, meeting requirements of Section 062000; type at fabricator's option.
  - 1. Where the core is free of urea formaldehyde, provide a layer of veneer over the substrate prior to application of finish veneer to prevent telegraphing of patterns of the adhesive.
- C. Thickness: 3/4" thick.
- D. Face Veneers: Panels shall be flitch matched, sequence matched, book matched, end matched, center balanced, rift sliced, vertical grain, and shall be matched for color. Wood species shall be as indicated. Use this veneer in all other areas where wood paneling is required. All panels shall be matched one to the other using "blueprint" matching method. Veneer shall be minimum 1/28" thick.
- E. Finish: Veneers shall be finely sanded and clear factory pre-finished using AWI System noted herein.
- F. Panel Sizes: See drawings for panel sizes required.
- G. Exposed edges of panels shall be solid sections matching face veneer.

H. Where wood doors are set in veneered wood paneling, veneer on door shall be sequenced to fit veneer pattern; doors to meet the requirements of Section 081416.

## 2.13 BANQUETTE SEATING

- A. Frames: Constructed of selected kiln-dried hardwood of 4/4 stock surfaced two sides which are doweled, glued, nailed and screws. All joints shall be reinforced with glueblocks and all oak wood upright members shall be placed on approximately 24" center lines. Bases recessed.
- B. Solid Surfacing finish panels, 1/4" thick, see section 2.6,C above. Color of panels as per Finish Color Schedule in Arch Dwgs.
- C. Bases: Porcelain tile to match tile base in Dining Room; see Section 093013.
- D. Backs and Seats: Upholstery details are tuck and welted on all cushions. All upholstered seats shall be set over 3/4" plywood panel which is screw mounted to frame. Tops of cushions extend above padded frame capping. Back and seats are medum and high density foam in thickness as shown on Architectural
- E. Medium- and High-Density Foam: Thickness and density as indicated, 40 lb. compression foam plus dacron. All foam in seats and back shall be encapsulated with thermal wrap, type as required by upholstery conditions encountered, or approved equal.
- F. Fabric/ Upholstery at Banquette Seating: As scheduled on Finish Schedule.
- G. Table Tops: Fire-retardant MDF with solid surfacing top with self edge as shown on the drawings at all sides. Support shall be on steel legs with levelers, See Finish color Schedule on Architectural Drawings.

#### 2.14 SOLID SURFACING MATERIAL COUNTERTOPS

- A. Provide 1/2" thick "Krion" countertops, with integral bowls where indicated, as manufactured by Porcelanosa Goup, or Dupont Corian or Avonite Surfaces, meeting standards specified herein. Basis of Design color as specified in Finish Colors Schedule on Architectural Drawings.
- B. Material: Cast, filled, acrylic; not coated, laminated or of composite construction, meeting ANSI Z124-1980, Type Six, and ISS FA-2.01 "Classification and Standards Publication of Solid Surfacing Material" as published by the International Solid Surface Fabricators Association (ISSFA).
- C. Countertops shall be adhesively joined with no exposed seams, having edge details shown on drawings.
- D. Joint Adhesive: Manufacturer's standard two-part adhesive kit to create inconspicuous, non-porous joints.

E. Sealant: Manufacturer's standard mildew-resistant, FDA/UL recognized silicone sealant in colors matching components.

## F. Fabrication

- 1. Fabricator must be approved by the solid surface manufacturer.
- 2. Factory fabricate components to custom sizes and shapes indicated, in accordance with approved shop drawings.
- 3. Form joints between components using manufacturer's standard joint adhesive; without conspicuous joints.
- 4. Provide factory cutouts for plumbing fittings and accessories as indicated on the drawings.
- 5. Cut and finish component edges with clean, sharp returns. Route radii and contours to template. Repair or reject defective and inaccurate work.
- G. Warranty: The manufacturer shall warrant to the Owner that the manufacturer will repair or replace (at his option), without charge, such product that fails because of a manufacturing defect during the first 10 years after initial installation. This includes all labor charges needed to repair or replace the product covered hereinunder.

## 2.15 FABRICATION - GENERAL

- A. Provide lumber framing for architectural woodwork, complete with all bracing and fastening devices as required for a rigid installation, and as required to sustain the imposed loads.
- B. Do all fabrication from field measurement with provision for scribing as required to meet built-in conditions.
- C. Coordinate the work of this Section with the work of other trades.
- D. Fabricate units in largest practicable sections. Assemble in the shop for trial fit, disassemble for shipment and reassemble with concealed fasteners.
- E. Maintain relative humidity and temperature during fabrication, storage and finishing operations matching that of the areas of installation.
- F. Details indicate the required type and quality of construction. Modifications to conform to manufacturer's standards will be considered provided that they comply with the Contract Documents and maintain the profiles shown, subject to acceptance by the Architect.
- G. Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage,

buckle, glue and open joints, or other defects affecting serviceability or appearance. Accurately fit all joints, corners and miters. Conceal all fasteners. Make threaded connections up tight so that threads are entirely concealed.

- H. Factory finish all items where possible. Defer final touch-up, cleaning and polishing until after delivery and installation.
- I. Comply with AWI, Premium Grade, for sanding, filling countersunk fasteners, back priming and similar preparations for the finishing of architectural woodwork, as applicable to each unit of work.
- J. Prepare all countersunk wood screw attachments for wood plugs. Wood plugs shall match surrounding species and grain direction; putty filling is not acceptable.

## 2.16 FABRICATION - SPECIFIC ITEMS

#### A. Millwork

- 1. Include all preparations for mechanical, electrical, telephone and plumbing work required.
- 2. Provide cabinet hardware for millwork as shown.
- 3. Provide dust panels in body webs and between drawer units.
- 4. Provide wood veneers for exposed surfaces as specified herein before.
- 5. Hollow core doors will not be permitted.
- 6. Provide matching veneers for edge treatments of case body members where transparent finishes are indicated or specified.
- 7. Provide drawers with slides as specified. Drawers shall not rest on web body frames.
- 8. Provide wood veneers for transparent finish, of matching and continuing grain, for drawer and door edges.

## B. Paneling

- 1. General Paneling Requirements
  - a. Panel type shall be AWS, Premium Grade construction.
  - b. Panel joints shall be flush type unless otherwise shown.
  - c. Provide concealed wood blocking and framing, anchors, clips, splines, supporting and attaching devices.
  - d. Provide cut-outs to receive attachments, mechanical and electrical work as required.

## 2. Wood Veneer Paneling

- a. Comply with AWS Section 8.
- b. Provide veneers as specified and as shown, including all matching requirements. Run veneer in the direction shown.

## Stile and Rail Paneling

- a. Comply with AWS Section 8.
- All exposed edges of panel cores shall be edge banded.
- c. Grain direction shall be as shown.

## C. Closet and Storage Shelving

- 1. Provide closet and storage shelving in accordance with AWS, Custom Grade, unless otherwise shown or specified.
- 2. Exposed edges shall have hardwood edge bands.
- D. Standing and Running Trim: Provide standing and running trim of the sizes, profiles, species and finish as specified or shown and complying with AWS Section 6, Premium Grade.

## PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where architectural woodwork is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 FRAMING

- A. Use specified framing lumber, sizes and spacing as indicated on drawings and as required to support loads.
- B. Framing shall be cut square on bearings, closely fitted, accurately set to required lines and levels, rigidly secured in place at bearings and connection with nails, lag screws and/or bolts as required by conditions.

## 3.3 GROUNDS, BLOCKING, NAILERS AND FURRING

A. Provide all wood grounds, blocking, nailers, furring, and the like for work of this Section, where shown and where required, dressed to size indicated or required to suit

the condition. Install grounds, blocking, nailers, furring, etc., rigidly, in proper alignment, trued with a long straight edge.

## 3.4 ROUGH HARDWARE

- A. Provide all rough hardware, such as nails, screws, bolts, anchors, hangers, clips and similar items. Hardware shall be of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner. Use galvanized hardware at exterior walls, and at other locations where subject to moisture or where water will be present.
- B. Secure wood to concrete and to solid masonry with countersunk bolts in expansion sleeves or other approved manner, to steel with countersunk bolts, to hollow masonry and to drywall with heavy duty countersunk toggle bolts. Space fastenings not more than sixteen (16) inches apart. Hardened cut nails, power-driven fastenings, or other suitable devices may be used where approved by the Architect.
- C. Connections and fastenings shall be made in such manner as will compensate for swelling and shrinkage and shall permit the work to remain permanently in place without any splitting or opening of joints.

#### 3.5 INSTALLATION OF CABINET FINISH HARDWARE

- A. All items of finish hardware furnished under this Section shall be carefully fitted and secured in place as part of the work of this Section. Locations and positioning of hardware shall be subject to the Architect's approval. Care shall be taken not to mar or damage hardware, or other work. Install doors plumb and true. Hardware shall be fitted to assure operation without forcing.
- B. After preliminary fitting of hardware, the Contractor shall remove trim for painting and finishing work; after which he shall reinstall the hardware in a permanent manner.
- C. Upon completion of the work, before final acceptance of the building by the Owner, the Contractor shall, in the presence of the Architect, show that all hardware is in satisfactory working order; fit all keys in their respective locks and, upon acceptance of the work, shall tag and deliver all keys to the Architect and Owner.
- D. When directed by the Owner, at any time during the first year after the completion of the Contract, the Contractor shall return to the building and adjust and refit the work and hardware, and leave such items in satisfactory working order.

#### 3.6 GENERAL INSTALLATION

A. Wall anchorage and general installation procedures for cabinetry work shall conform to AWS Section 10, Article entitled "EXECUTION," Sub-Article 6.1, with all related subparagraphs.

- B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including countertops), and with 1/16" maximum offset in flush adjoining surfaces, 1/8" maximum offset in revealed adjoining surfaces.
- Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
- D. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation.
- 3.7 TRIM, MOLDINGS, ETC.
  - A. Install with minimum number of joints possible, using full-length pieces for each run. Stagger joints in adjacent and related members. Cope at returns, miter corner.
  - B. Joints of all trim and/or moldings shall be set tight, miter exterior angles and cope interior angles. Joints, except end joints less than twelve (12) feet apart, will not be permitted in straight runs of trim and/or moldings and rails.
  - C. Secure all trim and/or moldings with glue and blind nail with finishing nails. Set exposed nail heads in finished work and putty. Sand all work to remove any tool marks and irregularities.
  - D. Wood shall receive finish as specified in Section 099000, "Painting and Finishing."

## 3.8 VENEERED WOOD PANELS

- A. Provide a system of concealed panel hanger clips, shims and corresponding wall clips to support the panel system. Face nailing shall not be permitted.
- B. Hang the panels in the designated locations. Panels shall be straight, level, flat and flush with adjoining panels.
- C. Where reveals are indicated, keep panels spaced so that reveals are parallel and of widths shown.

#### 3.9 CLOSET AND STORAGE SHELVING

A. Provide closet and storage shelving at the locations shown. Provide hang rods where shown. Set adjustable center hangers.

## 3.10 CABINET WORK AND MILLWORK

A. General

- 1. Materials and workmanship shall conform to the Quality Standards of the Architectural Woodwork Institute specified herein and to the drawings.
- 2. Cabinet work and millwork shall be performed by experienced cabinet work and millwork company, having craftsmen skilled in their trade.
- Fabricate all cabinet work and millwork completely in the shop, in complete and/or
  as large units as practical, leaving only fitting, assembly, installation and a
  minimum of fabrication and finishing to be done at the building. Assembled work
  shall be rigidly secured and permanently fastened together with concealed
  fasteners.
- 4. Afford Architect every facility for inspection of work at shop or mill at such times as the Architect may select.
- 5. As far as practicable, use concealed fastenings for joining and assembling the work. Where this is impossible, the means of securing shall be placed in inconspicuous places and methods of joining and assembling submitted for Architect's approval prior to fabrication.
- 6. Mill all finish wood accurately to detail, with clean cut moldings, profiles and lines, machined, sanded smooth, housed, jointed, blocked, put together in the best manner, with provision for swelling and shrinkage, and to assure the work remaining in place without warping, splitting or opening of joints.
- 7. Cut trim to dimensions and profiles shown, from solid stock.
- 8. Make all trim and the like in single lengths wherever possible; joints mitered, glued and splined. Continuous members shall have tight flush joints, doweled or splined and glued.
- Make all joints hairline tight, fitted accurately and joined with hardwood splines or dowels, glued together, or by other method approved by Architect. Use screws, not nails, for fastenings.
- 10. Gluing shall, where practicable, be by the hot plate press method and glued surfaces shall be in close contact throughout. Glue stains on finished work will not be permitted.
- 11. Cover surface fastenings, where permitted, with matching wood plugs or wood putty. Finish exposed edges of plywood with matching solid stock. Lock miter external corners; tongue and groove internal corners to allow for contraction and expansion.
- 12. Machine sand with grain, finish with hand sanding, leave exposed surfaces free from machine or tool marks that will show through the finish.

- 13. Work which adjoins drywall, concrete, or other finish shall be fitted and scribed in a careful manner and ample allowance shall be given for cutting and scribing.
- 14. Erect work true to lines, levels and dimensions, square, aligned and plumb, securely and rigidly fastened in place.
- B. Cabinet Work: Provide all items of cabinet work indicated on drawings and as herein specified.
  - Tops, sides, backs, bottoms, dividers, shelves, fronts, doors and drawer fronts shall be of plywood or flakeboard core, with the specified wood veneer or plastic laminate as indicated on drawings.
  - 2. Drawer sides and backs shall be 1/2" thick solid clear selected white birch, suitable for clear finish. Drawer bottom shall be 3/8" thick plywood with clear selected white birch veneers, suitable for clear finish.
  - 3. Cabinet doors and drawers shall be flush mounted.
  - 4. Adjustable shelves in cabinets shall have grommets spaced 2" o.c.
  - 5. Fixed shelves shall be dadoed into side supports and glued.
  - 6. Shelves shall be 3/4" thick for spans up to 30"; for spans in excess of 30" to 48" shelves shall be 1" thick.
  - 7. All cabinets shall have closed top, sides, bottom, and back with veneers to match face work. Cabinets to fit accurately into indicated locations; scribe moldings permitted only where indicated.
  - 8. Countertops, counters, counter fronts, shelves, etc., indicated on drawings to have plastic laminate, shall have plastic laminate shop applied to 3/4" thick core, with plastic laminate backing sheet on underside or back of countertops, counters and shelves. Plastic laminate shall be pressure laminated to core with laminate at external corners. Provide concealed wood framing to support plastic laminate counters, securely fastened to wall and to underside of counters.
- C. Countertops shall be installed to support a minimum concentrated live load of 150 lbs. acting downward at mid span at outer edge of counter without causing deformation and damage.

## 3.11 WOOD BASES

- A. Provide plywood backing, toggle bolted to substrate, if substrate not suitable for securing wood base.
- B. Machine wood bases from specified wood, to profiles indicated on drawings.

- C. Set base level and plumb. Where indicated on drawings, face of wood base shall be flush with wall above. Glue wood base to substrate or to plywood backing, and screw or nail wood base to substrate or to plywood backing with countersunk wood screws or with finishing nails, recess wood screw heads, and spackle with wood putty, set and spackle nails with wood putty. Do not nail or fasten wood base to floor. Ends of wood base shall be either splined or ship lapped.
- D. Where no wood backing occurs, screw apply base at each stud with screw countersunk and wood putty applied and sanded smooth and flush with base.

#### 3.12 WOOD DOOR FRAMES

A. Where indicated on drawings, provide wood frames and bucks for wood doors. Bucks shall be braced, set straight and plumb and have anchors for building into adjoining construction; space anchors not over two (2) feet apart (one foot from corners). Machine wood frames from specified solid wood to profiles indicated on drawings. Set frames plumb, level, square; securely attached to adjoining construction. Wood frames, bucks and trim shall conform to details.

#### 3.13 PAINTING AND FINISHING

- A. General: All painting and finishing work of this Section shall be shop applied, unless otherwise noted, as specified below. All painting and finishing shall match approved samples. Field finish painting, where specified below, shall be by painting Subcontractor, as specified for in Painting Section.
- B. Back-Painting: All work of this Section in contact with concrete or masonry or other moisture areas and all concealed surfaces of cabinet and millwork, shall be back-painted with one (1) coat of oil based paint prior to installation, shop applied where practicable.
- C. Field Touch-Up: Field touch-up shall be the responsibility of the installing Subcontractor, and shall include the filling and touch-up of exposed job made nail or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and mars, and final cleaning up of the finished surfaces.

## 3.14 CLEAN UP AND PROTECTION

- A. Clean Up: At regular intervals during the course of the work, all debris and excess material shall be cleaned up and removed from the site. Upon completion of installation, clean all spaces of debris caused by woodwork installation.
- B. Protection: Protect all woodwork from marring, defacement of other damage until final completion and acceptance of the project by the Owner. Repair or replace all defective units prior to final inspection as directed by the Architect. Any units that cannot be satisfactorily repaired in the opinion of the Architect shall be replaced with new units of same original design, at no additional cost to the Owner.

**END OF SECTION** 

#### **PART 1 - GENERAL**

#### 1.1 RELATED DOCUMENTS

- **A.** Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- **B.** OPR and BoD documentation are included by reference for information only.
- C. The Commissioning Plan.

#### 1.2 SUMMARY

- **A.** This Section includes general requirements that apply to implementation of the commissioning process without regard to specific systems, assemblies, and components.
- B. Commissioning of the building assemblies is focused on thermal and moisture integrity of the envelope.
- C. Related Sections include the following:
  - 1. Division 01 Section 01 91 00 Commissioning for general commissioning process activities.
  - 2. Divisions 2 through 9
  - 3. The Building Commissioning Plan

#### 1.3 DEFINITIONS

- **A.** Commissioning Plan: A document, prepared by CxA, that outlines the organization, schedule, allocation of resources, and documentation requirements of the commissioning process. This Plan is included in Volume 4 of these specifications.
- B. CxA: Commissioning Authority.
- **C.** Quality Assurance: A program for the systematic monitoring and evaluation of the various aspects of a system, assembly, or component to ensure that standards of quality are being met. This is the responsibility of the CxA.
- **D.** Quality Control: A system for ensuring the maintenance of proper standards in systems, assemblies, and components. This is the responsibility of the Contractor installing the assembly, product or system.
- E. Official: State or Local official having jurisdiction over the building assembly systems
- **F.** Systems, Assemblies, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, equipment, and components.

#### PART 2 - PRODUCTS (NOT USED)

#### **PART 3 - EXECUTION**

#### 3.1 COMMISSIONING AUTHORITY'S DUTIES

- A. Coordinate with the CMR, Architect and Contractor installing the assembly, product or system.
- **B.** Promptly notify CMR, Architect and Contractors of irregularities or deficiencies in work that are observed during performance of services.
- **C.** Be present to observe all testing of all building exterior enclosure systems as defined in the Contract Documents.
- **D.** Commissioning Authority is not authorized to:
  - 1. Release, revoke, alter or expand requirements of Contract Documents.
  - 2. Approve or accept any portion of the work.
  - 3. Perform any duties of the Contractors.

#### 3.2 TESTING VERIFICATION

At substantial completion of the project:

#### A.The CMR is to:

- Certify that building exterior enclosure systems, subsystems, and construction have been completed according to the Contract Documents, including all addenda and change order requirements.
- Certify that Field Quality Control procedures have been completed, and that field quality control reports have been submitted, discrepancies corrected, and corrective work approved. Provide a copy of the list of non-conformances maintained by the CMR indicating all rework and corrections completed.

#### **B.**The Commissioning Authority is to:

- 1. Verify that Field Quality Control procedures have been completed, and that field quality control reports have been submitted, discrepancies corrected, and corrective work approved.
- 2. Annotate checklist or data sheets when a deficiency is observed.
- 3. Verify that field quality-control testing of building exterior enclosure has been completed and approved. The Commissioning Authority shall observe and document field quality-control tests and inspections.

#### 3.3 DEFERRED TESTING

**A.** If field tests cannot be completed because of a deficiency outside the scope of the Building Exterior Enclosure, the deficiency shall be documented and reported to the Owner and the Architect-of-Record. Deficiencies shall be resolved and corrected by appropriate parties and the test rescheduled.

#### 3.4 TESTING REPORTS

- **A.** Testing reports shall include measured data, data sheets, and a comprehensive summary describing the specific building exterior enclosure systems at the time of testing.
- **B.** Prepare a preliminary test report. Deficiencies will be evaluated by the Architect and the Commissioning Authority building exterior enclosure commissioning sub-consultant to determine corrective action. Deficiencies shall be corrected and test repeated. All repairs are to be documented by the Commissioning Authority.
- C. If it is determined that the system is constructed according to the Contract Documents, the Owner will decide whether modifications are required to bring the performance of the system to a level where the failure or deficiency is eliminated and shall be implemented or if the test results will be accepted as submitted. If corrective Work is performed, the Owner will decide if tests shall be repeated and a revised report is to be submitted.

## 3.5 SYSTEMS TO BE COMMISSIONED

- **A.** Refer to Divisions 2 through 9 of the Specification Sections for specific requirements for commissioning each building exterior enclosure element and system. The systems and elements to be commissioned include, but are not limited to:
  - 1. Exterior walls
  - 2. Exterior windows
  - 3. Exterior doors
  - 4. Louvers and vents
  - 5. Grilles and sunscreens
  - **6.** Roof systems, including parapet
  - 7. Roof openings, including skylights, pipe chases and ducts
  - 8. Infrared scan of roof (Witness)

## 3.6 SAMPLE DOCUMENTATION

## S A M P L E Installation Checklist Aluminum Construction

(Entrances, Vestibules, Curtain walls, Storefronts, Windows, Glazing)

Schedule ID# from drawings: Location: Exterior walls

Reference Specification:

Reference Drawing: Various

## **Model Verification**

		Specified	Submitted			Installed	
Manufacturer							
	Model Number stallation Checks:						
ID	Description			Pass	Fail	Comments	
		matches approved samples and	that color matches			Comments	
1	between panels and	parts are within the specified ran	ge.				
2	•	in and free of dents, scratches, b					
3	damage after uncratir	pre-assembled panels are chech ng; and size, shape, thickness of details when available.					
4	Verify that a mock up	was built and approved.					
5	Verify that system join	nts are tight and sealed as requi	red.				
6	Verify weep holes and fore and after erection	d drainage systems are provided า.	d and are clean be-				
7		tem dimensional tolerances are within horizontal and vertical alig					
8	Verify proper glazing	is installed. (Tempered, tinted, le	ow E, insulated).				
9	and without visible de						
10	screws are covered w						
11	Verify sealants and poper-construction seals	rimers are those approved and t ant tests.	hat have passed the				
12	Verify that dissimilar r	metals are isolated to protect ag	ainst galvanic action				
13	Verify that where alur surfaces are painted	minum contacts concrete or mas with bituminous paint.	onry, that contact				
14	Verify expansion joint	s are provided between units as	required.				
15	Verify sealant joints a are not wider than de	re located as required; and are tailed.	neat, uniform and				
16	Verify field-applied se required.	ealant is of proper type and color	and applied where				
17	Verify reveals are of o	consistent size and alignment.					
18	Verify electric or pneunated and provided.	umatic outlets and locations, if re	quired, are coordi-				
19	Verify flashings are in dow/curtain wall man	stalled as detailed and as coord ufacturer.	inated with win-				
20	Verify anchorage to s	tructure is secure for transfer of	wind load.				
21	Verify door and opera	able window hardware provisions	s have been coordi-				
22	Obtain manufacturer's	s touch-up painting procedures					
23	Field water test thresh	holds, flashings, end dams.					

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# SECTION 07 08 00 COMMISSIONING OF BUILDING ASSEMBLIES

## PAGE 4 OF 6

Approvals	Name (printed neatly)	Signature	Date
Construction Manager			
Installing Contractor			

#### SAMPLE

## Functional Performance Test Building Envelope - Curtain Wall: Air & Water Infiltration Test

1. Partic	cipants		<u>Name</u>		Represer	nting (Company)	
Commis	sioning Agent (Cx/	A):					
Metal wi	indow trade	·					
contract	or:						
CMR:		·					
Owner's	Representative:						
•	· ·	nd witnessing testing:					
2. Test I	Prerequisites						
a	•	lope construction che tractor is ready for fu			d approved inc	dicating that the metal	
	Location:	Elevation	Floor	From grid li	ine	to grid line	
	Location:	Elevation	Floor	From grid li	ine	to grid line	
	Location:	Elevation	Floor	From grid li	ine	to grid line	
	Location:	Elevation	Floor	From grid li	ne	to grid line	
b	All A/E punch list items for these sections of the fenestration system have been corrected.						
c	This functional test procedure has been reviewed and agreed to by metal window trade contractor.						
d	Testing shall be performed per the Testing Schedule (attached).						
e	Equipment required for access has been coordinated with test schedule.						
f	Water connection for hose is available and has adequate pressure required for test.						
g		d has previously faile y metal window trade				e Action Report) has e and system is ready	

## 3. Verification of Associated Construction Checks.

Associated construction checklist and reports for systems being functionally tested are successfully completed? Y/N

PAGE 6 OF 6

Testing Schedule:

Seq.	Mode ID	Test Procedure [including special conditions] Expected and Actual Response [Write ACTUAL response in		Pass Y/N	Note #
1	ALUMINUM	Field test installed fenestration	brackets or circle]  No water leakage.		
	CURTAIN WALL / STORE FRONT WATER INFILTRATION TESTS	components as directed by CxA in accordance with ASTM 1105-96 Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform or Cyclic Static Air Pressure Difference. The ASTM 1105 test shall be conducted at an air pressure difference of 6.24 lbs/ft2.  2. The exact locations of each test site will be determined in the field by the Architect, per the project manual.			
2	WATER INFILTRATION TESTS (FIXED WINDOW)	1. Field test installed fenestration components as directed by CxA in accordance with AAMA 501.2-03 (Hose Test) Method of Test for Exterior Walls. Standard Test Method for Field Determination of Water Penetration of Exterior Windows, Curtain Walls and Doors.  2. The exact locations of each test site will be determined in the field by the Architect, per the project manual.	No water leakage.		

**END OF TEST** 

END OF SECTION 07 08 00

#### PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the below grade dampproofing as shown on the drawings and/or specified herein, including but not limited to, the following:
  - 1. Dampproofing applied to below-grade brick shelf at footings below grade without basement.

#### 2. Protection board.

## 1.3 RELATED SECTIONS

- A. Cast-in-Place Concrete Section 033000.
- B. Earthwork Section 02 21 00.

#### 1.4 SUBMITTALS

- A. Product data for each type of product specified, including data substantiating that materials comply with requirements for each dampproofing material specified. Include recommended method of application, recommended primer, number of coats, coverage or thickness, and recommended protection course.
- B. Certification by dampproofing manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

## 1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site, ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type of material, brand name, and manufacturer's name. Delivered materials shall be identical to approved samples.
- B. Store materials under cover in a dry and clean location, off the ground. Remove materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials.

#### 1.6 JOB CONDITIONS

A. Environmental Requirements: Dampproofing materials shall not be installed on wet surfaces, or when the temperature is 32 deg. F. and falling.

## PART 2 PRODUCTS

## 2.1 MATERIALS

- A. Provide trowel grade mastic manufactured from a blend of selected asphalts, stabilizers, fibers and solvents in compliance with ASTM D 4586, Type 1, (non-asbestos) by Henry 789 Fibered Asphalt Emulsion Dampproofing; subject to compliance with requirements specified, other acceptable manufacturers include Sonneborn and Anti Hydro.
- B. Priming Material: Applied to the concrete surfaces prior to the installation of the dampproofing, as required and/or recommended by the manufacturer.

- C. Protection Boards: For the protection of the dampproofing after installation and before backfilling: provide 1/8" thick, multi-ply, semi-rigid board, consisting of a mineral stabilized asphalt core sandwiched between layers of asphalt saturated felt, and faced on one side with polyethylene film.
  - 1. W.R. Meadows Inc.
  - 2. Sonneborn.
  - 3. Tremco
- D. Glass Fabric: Woven glass fabric, treated with asphalt, complying with ASTM D 1668, Type I.

#### PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where below grade dampproofing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 PREPARATION

- A. Surfaces to Receive Dampproofing: Clean, dry, smooth and free from surface treatments which may inhibit the bond of the dampproofing. Treat imperfections in these surfaces such as large cracks, honeycombs and holes prior to the dampproofing application, by repair work consisting of filling with cement, or as directed.
- B. Install separate flashings and corner protection stripping, as recommended by prime materials manufacturer, where indicated to precede application of dampproofing. Comply with details shown and with manufacturer's recommendations. Pay particular attention to requirements at building expansion joints, if any.
- C. The start of the dampproofing installation shall imply acceptance of those surfaces, and conditions encountered in the field, to install the work, as recommended and as specified.

#### 3.3 INSTALLATION

- A. Perform the work using skilled workmen in accordance with the acceptable manufacturer's instructions and directions.
- B. Prime surfaces to receive dampproofing using primer as recommended by the manufacturer, carefully following label instructions as to rate of coverage.

- C. Apply two (2) coats of dampproofing continuously, at a rate of 6 gallon/100 sq. ft. per coat.
- D. At changes in plane or where otherwise shown as "reinforced," install lapped course of glass fabric in first coat of dampproofing compound before it thickens.
- E. Install 2" x 2" cant strip of bituminous grout at base of vertical dampproofing where it meets horizontal surface.
- F. Apply vertical dampproofing down walls from finished grade line to top of footing, extend over top of footing, and down a minimum of 6" over outside face of footing. Extend 12" onto intersecting walls and footings, but do not extend onto surfaces exposed to view when the Project is completed.
- G. Protect the installed dampproofing by embedding the protection boards into the dampproofing when the dampproofing becomes tacky, or as recommended by the manufacturer.

## 3.4 PROTECTION

- A. Protect surfaces adjacent to the dampproofing operations against staining or other damage during the work of this Section.
- B. Staining or soiling which does occur to the adjacent materials shall be removed as the work progresses, including smear, spills or displaced materials. Leave installed work in a neat condition upon completion.
- C. Backfilling against completed dampproofing shall not occur for at least 72 hours.

**END OF SECTION** 

#### PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the thermal insulation as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Cavity wall insulation within masonry cavity.

- 2. Miscellaneous blanket insulation.
- 3. Foundation wall insulation below grade and stone cladding at grade.
- 4. Attachment devices.

## 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Firestops and Smokeseals Section 078413.
- C. Gypsum Drywall Section 092900, for acoustical insulation.

#### 1.4 SUBMITTALS

- A. Submit product data for each type of product indicated, including re-cycled content.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulation products.

## 1.5 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type and brand. Delivered materials shall be identical to approved samples.
- B. Store materials under cover in a dry and clean location, off the ground. Remove materials which are damaged or otherwise not suitable for installation and replace with acceptable materials.
- C. Take every precaution to prevent the insulation from becoming wet. Cover with tarps or other weather/watertight sheet goods.

## PART 2 PRODUCTS

#### 2.1 CAVITY WALL INSULATION WITHIN MASONRY CAVITY

A. Provide mineral wool fiber board insulation "CavityRock MD" manufactured by Roxul, subject to compliance requirement specified, Thermafiber Rain Barrier 45, conforming to ASTM C 612, Type IVB with a maximum flame spread and smoke developed indices of 0 and 5 respectively.

- 1. Boards shall be 16" wide x 96" long; boards shall be 3" thick unless otherwise noted on the drawings.
- 2. Insulation shall have an aged R value of not less than 4.2/inch.

## 2.2 BLANKET INSULATION

- A. Provide flexible glass fiber blankets/batts "Fiberglass Flame Spread 25 Insulation" as manufactured by Owens Corning or made by Manville or Certainteed conforming to ASTM C 612, Type 1A or ASTM C 665, Type III, Class A, faced on one side with foil reinforced Kraft vapor retarder; maximum flame spread and smoke developed indices 25 and 50 respectively.
- B. Insulation shall have an R value of not less than 3.7/inch and shall be 3.5" thick unless otherwise noted on the drawings.

## 2.3 FOUNDATION WALL AND UNDERSLAB INSULATION

- A. Provide extruded polystyrene board insulation "Styrofoam" manufactured by Dow Chemical Co., or made by Owens Corning or PACTIV Building Products, conforming to ASTM C 578, Type IV, with a maximum flame spread and smoke developed indices of 75 and 450 respectively.
- B. Insulation shall have an aged R value of not less than 5/inch; shall be 2" thick unless otherwise noted on the drawings.

## 2.4 ACCESSORIES

- A. Clips for Securing Insulation to Encountered Surfaces: Spindle anchor and washer type consisting of perforated metal plates with spindle welded to center and snap on washers. Spindle and washers shall receive a corrosion-resistant electro-zinc plating. Adhesives for securing clips in place shall be recommended by the approved clip manufacturer.
  - 1. Acceptable Manufacturers
    - Miracle Adhesives Corp.
    - b. Stic-Klip Mfg. Co., Inc.
    - c. Midwest Fasteners
- B. Adhesive for Bonding Insulation: The type recommended by the insulation manufacturer, and complying with fire-resistance requirements.
  - For bonding rigid polystyrene insulation to masonry or concrete, provide adhesive "Foamgrab PS" made by Dacor Products Co. or ChemRex Inc. or Miracle Adhesives.

#### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where thermal insulation is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION, GENERAL

- A. Clean substrates of substances that are harmful to insulation including removing projections capable of puncturing vapor retarders, or that interfere with insulation attachment.
- B. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- C. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- D. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

## 3.3 INSTALLATION OF BELOW-GRADE INSULATION

- A. On vertical surfaces, set insulation units using manufacturer's recommended adhesive according to manufacturer's written instructions.
  - 1. If not otherwise indicated, extend insulation a minimum of 24 inches below exterior grade line.
- B. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.
  - 1. If not otherwise indicated, extend insulation a minimum of 36 inches in from exterior walls.

#### 3.4 INSTALLATION OF CAVITY-WALL INSULATION

A. Install pads of adhesive spaced approximately 24" o.c. both ways on inside face, and as recommended by manufacturer. Fit courses of insulation between wall ties and

other obstructions, with edges butted tightly in both directions. Press units firmly against inside substrates.

 Supplement adhesive attachment of insulation by securing boards with two-piece wall ties designed for this purpose and specified in Section 042000 "Unit Masonry."

## 3.5 INSTALLATION OF BLANKET INSULATION FOR FRAMED CONSTRUCTION

- A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
- B. Glass-Fiber or Mineral-Wool Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
  - Use insulation widths and lengths that fill the cavities formed by framing members.
     If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
  - 2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
  - 3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
  - 4. For metal-framed wall cavities where cavity heights exceed 96", support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.
  - 5. Vapor-Retarder-Faced Blankets: Tape joints and ruptures in vapor-retarder facings, and seal each continuous area of insulation to ensure airtight installation.
    - a. Exterior Walls: Set units with facing placed toward interior of construction as indicated on Drawings.

## 3.6 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

**END OF SECTION** 



#### PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. The Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the vapor permeable air barrier liquid membrane as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Vapor retarder/air barrier applied over sheathing board and cold formed metal framing and CMU.

- 2. Materials and installation to bridge and seal the following air leakage pathways and gaps:
  - a. Connections of the walls to the roof.
  - b. Connections of the walls to the foundations.
  - c. Seismic and expansion joints.
  - d. Openings and penetrations of window frames, storefront, curtain wall.
  - e. Door frames.
  - f. Piping, conduit, duct and similar penetrations.
  - g. Masonry ties, screws, bolts and similar penetrations.
  - h. All other air leakage pathways in the building envelope.

#### 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Cold-Formed Metal Framing, including sheathing Section 054000.

#### 1.4 SUBMITTALS

- A. Provide evidence to the Architect of licensing and certification under the Air Barrier Association of America's (ABAA's) Quality Assurance Program.
- B. Submit shop drawings showing locations and extent of air/vapor barrier and details of all typical conditions, intersections with other envelope systems and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated and how miscellaneous penetrations such as conduits, pipes electric boxes and the like are sealed.
- C. Submit manufacturer's product data sheets for each type of membrane, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.
- D. Submit manufacturer's data showing solids content of fluid applied membranes and coverage rates and wet film thickness upon application in order to achieve minimum dry film thickness required by this specification.
- E. Submit manufacturer's installation instructions.
- F. Submit certification by air/vapor barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- G. Submit certification of compatibility by air/vapor barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it, including sealant as specified in Section 054000 for caulking joints between sheathing panels.
- H. Submit samples, 3 by 4 inch minimum size, of each air/vapor barrier material required for Project.

- I. Test results of air permeability testing of primary air barrier material (ASTM E 2178-01).
- J. Test results of assembly in accordance with ASTM E 2357.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. Provide air/vapor barrier constructed to perform as a continuous air/vapor barrier, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.
- B. Provide an air barrier assembly that has been tested in accordance with the Air Barrier Association of America's (ABAA's) approved testing protocol to provide air leakage results not to exceed 0.01 cfm/sf @ 1.57 psf.
- C. Connections to Adjacent Materials: Provide connections to adjacent materials at the following locations and show same on shop drawings:
  - 1. Foundation and walls, including penetrations, ties and anchors.
  - 2. Walls, windows, curtain walls, storefronts, louvers or doors.
  - 3. Different wall assemblies, and fixed openings within those assemblies.
  - 4. Wall and roof connections.
  - 5. Floors over unconditioned space.
  - 6. Walls, floor and roof across construction, control and expansion joints.
  - 7. Walls, floors and roof to utility, pipe and duct penetrations.
  - 8. Seismic and expansion joints.
  - 9. All other leakage pathways in the building envelope.

## 1.6 QUALITY ASSURANCE

#### A. Installer Qualifications:

- The air barrier contractor shall be, during the bidding period as well as for the duration of the installation, officially recognized as a Licensed Contractor by the Air Barrier Association of America (ABAA). The contractor shall carry liability insurance and bonding.
- 2. Each worker who is installing air barriers must be either a Certified Applicator or an installer who is registered with ABAA.

- Each Lead Certified Applicator can supervise a maximum of five registered installers. The Certified Applicator shall be thoroughly trained and experienced in the installation of air barriers of the types being applied. Lead Certified Applicators shall perform or directly supervise all air/vapor barrier work on the project.
- B. Single-Source Responsibility: Obtain air/vapor barrier materials from a single manufacturer regularly engaged in manufacturing the product.
- C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).
- D. Field-Constructed Mock-Ups: Prior to installation of air/vapor barrier, apply air/vapor barrier as follows to verify details under shop drawing submittals and to demonstrate tie-ins with adjoining construction, and other termination conditions, as well as qualities of materials and execution:
  - Construct typical exterior wall panel, 8 feet long by 8 feet wide (one of CMU and one of sheathed areas) incorporating back-up wall, cladding, window and door frame and sill, insulation, flashing, building corner condition, and typical penetrations and gaps; illustrating materials interface and seals.
  - 2. Work describe above shall be done in situ, as part of the sequence of construction of the façade, not free standing.
- E. Test mock-up in accordance with ASTM E 783 and ASTM E 1105 for air and water infiltration.
- F. Manufacturer shall be on-site at least once a week to observe installation and provide written report within 3 days.
- G. Manufacturer shall confirm all termination details and compatibility with materials being terminated to.
- H. Vertical and Lateral Fire Propagation Test Characteristics: The exterior wall assembly is required to comply with NFPA 285 "Standard Method of Test for the Evaluation of Flammability Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components." The base wall, stud cavity insulation, wall sheathing, air barrier, continuous wall rigid insulation and exterior cladding are components that are required to be to be evaluated as part of this specific assembly test. The basis of design product listed below is a component of the design test assembly selected by the Architect.
- 1.7 DELIVERY, STORAGE, AND HANDLING
  - A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.

- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air/vapor barrier manufacturer. Protect stored materials from direct sunlight.
- Avoid spillage. Immediately notify Owner, Architect if spillage occurs and start clean up procedures.
- D. Clean spills and leave area as it was prior to spill.

#### 1.8 WARRANTY

A. System Warranty: Provide the manufacturer's three (3) year system warranty, including the primary air/vapor barrier and installed accessory sealant and membrane materials which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

## PART 2 PRODUCTS

## 2.1 MATERIALS

- A. Liquid Membrane: Henry Air-Bloc 31 Vapour Permeable Liquid Membrane or; subject to compliance with requirements specified, other acceptable manufacturers include Tremco ExoAir 220R/SP or ProSoCo Spray Wrap Cat 5, Sikaguard 530 by Sika or W.R. Grace. Trade names used herein are those of Basis of Design the Henry.
  - 1. Alternate: Self-adhering, vapor permeable air barrier membrane, Blue Skin VP160 by Henry Company or subject to compliance with requirements specified, other acceptable manufacturers include Tremco, Sika or W.R. Grace.
- B. Transition Membrane: Henry Blueskin Breather.
- C. Primer for Blueskin SA: Henry Blueskin Primer.
- D. Air Barrier Sealant: Henry Blueskin Sealant.
- E. Thermoplastic Rubber Sealant: Henry Pro-Seal Sealant.
- F. Substrate Cleaner: Mineral spirits or Xylol.
- G. Membrane in and around openings: Henry Air-Bloc LF.

## PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where the above grade waterproof membrane is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the work.

## 3.2 SURFACE PREPARATION

- All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants.
- B. Cracks in masonry and concrete up to 1/4" wide shall be filled with a trowel application of Air-Bloc 31 and allowed to cure overnight prior to application of the liquid membrane to the surface, or alternatively, the cracks may be sealed with a strip of Blueskin membrane applied to the substrate. Cracks wider than 1/4" should be sealed with Blueskin membrane adhered to the substrate lapped a minimum of 3" on both sides of the crack.
- C. Surfaces should be tied in with beams, columns, window and door frames, etc. using strips of Blueskin Breather lapped a minimum of 3" on both substrates. Mechanical attachment should be made to all window and door frames, or a properly designed sealant joint provided.

#### 3.3 TRANSITION MEMBRANE

- A. Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 3" overlap at all ends and side laps.
- B. Tie-in to window frames, metal door frames, etc., and at the interface of dissimilar materials as indicated on the Drawings.
- C. Promptly roll all laps and membrane with a counter top roller to effect seal.
- D. Ensure all preparatory work is complete prior to applying Air-Bloc 31.

## 3.4 THROUGH-WALL FLASHING MEMBRANE

- A. Align and position the leading edge of Blueskin TWF self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls or shelf angles, partially remove protective film and roll membrane over surface and up vertically.
- B. Press firmly into place. Ensure minimum 50mm overlap at all end and side laps.
- C. Promptly roll all laps and membrane to effect the seal.
- D. Ensure all preparatory work is complete prior to applying Blueskin TWF.
- E. Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the consultant.
- F. Apply through-wall flashing membrane along the base of masonry veneer walls, over windows, doors and all other wall openings. Membrane shall form continuous flashing and shall extend up a minimum of 4-1/2" up the back-up wall.

G. When flashing at window openings, wrap the entire window opening with air barrier flashing membrane.

#### 3.5 LIQUID MEMBRANE APPLICATION

- A. Apply Air-Bloc 31 to wall substrates in a continuous coat at manufacturer's recommended rate by spray or trowel to provide a minimum wet film thickness of 0.093".
  - 1. Minimum dry film thickness shall be 0.078".
- B. Overlap liquid membrane on to transition membrane at connections a minimum of 1".
- C. Trowel Air-Bloc 31 around ties and other projections to ensure a complete seal.
- D. Do not leave membrane exposed for any longer than 6 weeks.
- E. Penetrations: Seal all penetrations with termination mastic liquid membrane, sealant, flashing or other procedures in accordance with manufacturer's instructions.

### 3.6 PROTECTING AND CLEANING

- A. Protect air/vapor barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Protect air/vapor barrier from exposure to the elements as required by the manufacturer.
- D. Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work using procedures as recommended by manufacturer.
  - Schedule work to ensure that the air and vapor barrier system is covered as soon as possible after installation. Protect air and vapor barrier system from damage during subsequent operations. If the air and vapor barrier system cannot be permanently covered within 30 days after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

# 3.7 FIELD TESTING

A. Contractor shall hire testing laboratory to confirm that the system has been tested and passed requirements in accordance ASTM E 783 and ASTM E 1105 for air and water infiltration. Submit test results to Architect.

**END OF SECTION** 



# PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - i. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the aluminum screens as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Mechanical equipment screens at the Theater roof.
  - 2. Mechanical equipment screens at the Student Center roof are part of Supplemental Bid No. 2. See Section 012313 Supplemental Bids.

# 1.3 RELATED SECTIONS

- A. Supplemental bids Section 12313.
- B. Cold-Formed Metal Framing Section 054000.
- C. Joint Sealers Section 079200.

### 1.4 QUALITY ASSURANCE

- A. Structural Performance: Provide exterior metal screens capable of withstanding the effects of loads and stresses from wind and normal thermal movement without evidencing permanent deformation of screen components including blades, frames, and supports; noise or metal fatigue caused by screen blade rattle or flutter or permanent damage to fasteners and anchors.
- B. Specified Design Wind Loads: Per FM Global Data Sheet 1-28 Wind Design
  - 1. Student Center Addition
    - a. Field (Zone 4): Inward 44.8 psf, Outward 47.6 psf.
    - b. Corners (Zone 5): Inward 44.8 psf, Outward 55.9 psf.
  - 2. Theater Building
    - a. Field (Zone 4): Inward 40.0 psf, Outward 42.5 psf.
    - b. Corners (Zone 5): Inward 40.0 psf, Outward 49.9 psf.
  - 3. A safety factor of 2.0 should be applied to the inward and outward design pressures obtained from DataSheet 1-28. The pressures listed in the table are the base design pressures and are not intended asultimate design pressures (with safety factor applied).
- C. Thermal Movements: Provide screens that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, and other detrimental effects.
  - 1. Temperature Change (Range): 120 deg. F., ambient; 180 deg. F, material surfaces.
- D. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.
- Field Measurements: Verify size, location and placement of screen units prior to fabrication.
- F. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field

assembly of units. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, certified test data, where applicable, and installation instructions for required products, including finishes.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of screens units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.
- C. Samples: Submit six (6) inch square samples of each required finish. Prepare samples on metal of same gauge and alloy to be used in work. Where normal color and texture variations are to be expected, include two (2) or more units in each sample showing limits of such variations.

### 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

# 1.7 WARRANTY

A. Finish shall be warranted for a period of 20 years; starting from date of Substantial Completion of the Project.

## PART 2 PRODUCTS

## 2.1 MATERIALS

- A. Provide profiles and details shown on drawings are those of Centria "Concept Series CS-260," 7/8" deep x 12" wide concealed fastener panels with flat face, fabricated from eighteen (18) gauge commercial galvanized steel conforming to ASTM A 653 G-90 zinc coating, smooth finish. Unless otherwise noted; subject to compliance with requirements specified, other acceptable manufacturers include Pac-Clad Petersen Aluminum corp. and Englert Inc.
  - 1. Panels shall be fastened to the wall girts with minimum 16 gauge concealed clips and fasteners to allow for unimpeded thermal movement of the wall system. Clips shall be designed to hold panel 1/2" minimum from exterior substrate. Exposed fastened panels are unacceptable.

- 2. Panels shall be factory fabricated by roll-forming operations to assure consistency and quality of manufacture. Panels fabricated by press brake or folding machine are unacceptable.
- 3. Metal panels shall be fabricated from zinc-coated steel conforming to ASTM A 653, SS Grade 37, G90 coating, 18 gauge smooth surface texture.
- 4. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
  - a. Fluoropolymer Two-Coat System: Manufacturer's standard metallic three-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer colorcoat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.
  - b. Color shall be as selected by the Architect. Color samples shall be submitted and approved prior to application of color coating.

### 2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 211, Alloy 6063-T52.
- B. Clip Angles: Structural grade aluminum.
- C. Fastenings: Fasteners shall be aluminum or stainless steel. Provide types, gauge and lengths to suit unit installation conditions.
- D. Anchors and Inserts: Use non-ferrous metal or hot-dip galvanized anchors and inserts for installation and elsewhere as required for corrosion resistance. Use stainless steel or lead expansion bolt devices for drilled-in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- E. Sub-Girts: Metal sub-girts shall be formed from eighteen (18) gauge hot dip galvanized steel. Sub girts shall be of the adjustable type and shall conform to ASTM A 653 SQ, Grade 37, G90 coating.
- F. All exterior flashing shall be fabricated in the same material, gauge, finish, and color as the exterior profile, unless otherwise noted.
- G. Trim Material: Furnish necessary trim in conjunction with the metal wall system, including top, bottom, corner, end wall jamb, sill, head, and coping. Material shall be the same substrate, finish and gauge as the exterior siding unless otherwise noted. Corners of siding shall be preformed.
  - 1. Provide extruded aluminum Microline trim and galvanized steel Microline preformed corners as indicated on drawings.

### 2.3 FABRICATION

- A. Comply with dimensions, profile limitations, gauges and fabrication details shown and specified.
- B. Fabricate components of the system at factory, ready for field assembly.
- C. Fabricate components and assemble units to comply with performance requirements specified.
- D. Apply specified finishes in conformance with manufacturer's standards, and according to coating manufacturer's instructions.

# PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where aluminum screens are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

# 3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions and directions for the installation of anchorages which are to be embedded in masonry construction. Coordinate the delivery of such items to the project site.

# 3.3 INSTALLATION

- A. Locate and place screen units plumb, level and in proper alignment with adjacent work.
- B. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.
- D. Repair finishes damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Restore finishes and prime coats of paint so that there is no evidence of corrective work. Return items which cannot be refinished in the field to the shop, make the required alterations, and refinish the entire unit, or provide new units, at Contractor's option.
- E. Protect aluminum surfaces from corrosion by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.

F. Provide concealed gaskets, flashings, joint fillers and insulations, and install as the work progresses to make the installations weathertight.

**END OF SECTION** 

# PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the aluminum composite panels as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Preformed aluminum composite metal wall and soffit panels.

- 2. Preformed trim pieces, copings and accessory moldings.
- 3. All necessary seals and gaskets to weather-seal all exterior panel to panel joints.
- 4. Suspension system and supports for soffit panels.

# 1.3 RELATED SECTIONS

A. Cold-Formed Metal Framing - Section 054000.

## 1.4 SUBMITTALS

- A. Submit complete and detailed shop drawings, calculations indicating conformance with load and performance requirements, anchorage to structure, product data, and installation instructions prior to start of any fabrication. Drawings shall include all field dimensions, and shall indicate interface with windows set in metal cladding panels.
- B. Indicate dimensions, panel profile, panel layout, construction details, method of anchorage, and any other details as required for the specific installation.
- C. Submit 24" x 24" mock-up of each type of metal panel.
- D. Submit to Architect manufacturer's 12" x 12" color samples and finish samples for each panel type.
- E. Deflection Design: Design calculations, certified by a registered professional engineer, licensed in the State of Connecticut, shall be submitted to verify load carrying capability of panel system.
- F. Submit certification that systems meet performance standards.
- G. Shop Drawings for Soffits: Submit completely dimensioned soffit layout, showing:
  - 1. Any deviations from Architect's reflected ceiling plan layouts, especially lighting fixture and dimensions. Also indicate if any light fixtures will not fit into Architect's layout due to dimensional restrictions of field conditions.
  - 2. Direction and spacing of suspension members and location of hangers for carrying suspension members.
  - 3. Direction, sizes and types of metal units, showing suspension grid members, and starting point for each individual ceiling area.
  - 4. Moldings at perimeter of soffit, at columns and elsewhere as required due to penetrations or exposure at edge of panels.
  - 5. Location and direction of lights, air diffusers, air slots, and similar items in the soffit plane.

- 6. Details of construction and installation at all conditions.
- 7. Materials, gauges, thickness and finishes.

### 1.5 QUALITY ASSURANCE

- A. The Contractor, by commencing the work of this Section, assumes overall responsibility, as part of his warranty of the work, to assure that all assemblies, components and parts shown or required comply with the Contract Documents. The Contractor shall further warrant:
  - 1. That all components, specified or required to satisfactorily complete the installation, are compatible with each other and with the conditions of installation and expected use.
  - 2. The overall effective integration and correctness of individual parts and the whole of the system.
  - 3. Compatibility with adjoining substrates, materials and work of other trades.
  - 4. There shall be no premature material failure due to improper design and fabrication.
- B. Field measurements shall be taken prior to the completion of shop fabrication.
- C. Specified Design Wind Loads: Per FM Global Data Sheet 1-28 Wind Design
  - 1. Student Center Addition
    - a. Field (Zone 4): Inward 44.8 psf, Outward 47.6 psf.
    - b. Corners (Zone 5): Inward 44.8 psf, Outward 55.9 psf.
  - 2. Theater Building
    - a. Field (Zone 4): Inward 40.0 psf, Outward 42.5 psf.
    - b. Corners (Zone 5): Inward 40.0 psf, Outward 49.9 psf.
  - 3. A safety factor of 2.0 should be applied to the inward and outward design pressures obtained from DataSheet 1-28. The pressures listed in the table are the base design pressures and are not intended asultimate design pressures (with safety factor applied).
- 1.6 PRODUCT DELIVERY, STORAGE AND HANDLING
  - A. Protect panels and accessories during storage and construction against moisture, staining and physical damage.

B. Store panels under cover in a dry and clean location, off the ground. Do not store panels face down or in contact with earth or damaging foreign materials. Store panels with appropriate separating materials to prevent scratching, denting or abrading any panel surface.

### 1.7 JOB CONDITIONS

A. Review installation procedures and coordination with other work, with other trades whose work will be affected by work of this Section.

# 1.8 DELIVERY, STORAGE AND HANDLING

A. Protection: Materials shall be packed, unloaded, stored and protected to avoid abuse, damage and defacement from any source in accord with the recommendations contained in the AAMA Aluminum Curtain Wall Manual #10, "Care and Maintenance of Architectural Aluminum."

## 1.9 WARRANTY

A. Furnish manufacturer's ten-year warranty on materials and workmanship.

# PART 2 – PRODUCTS

## 2.1 MANUFACTURER

- A. Provide "Alucobond Plus" composite aluminum panels as manufactured by 3A Composites, "Reynobond FR" by Alcoa Architectural Products or "Alpolic/fr" by Mitsubishi Plastic Composites America, subject to all of the requirements of this section.
  - 1. Panel Thickness: 6 mm.

# 2.2 PANEL FABRICATION

A. Composition: Two sheets of aluminum sandwiching a solid core of fire rated mineral wool material formed in a continuous process with no glues or adhesives between dissimilar materials. The core material shall be free of voids and/or air spaces and not contain foamed insulation material. Products laminated sheet by sheet in a batch process using glues or adhesives between materials shall not be acceptable.

### B. Aluminum Face Sheets

1. Thickness: 0.5 mm.

## 2. Alloy

- a. AA3000 Series (Painted material)
- b. AA5000 Series (Anodized material)

C. Panel Thickness: 6 mm.

# D. Tolerances

- 1. Panel Bow: Maximum 0.8% of any 72" panel dimension.
- 2. Panel Dimensions: Field fabrication shall be allowed where necessary, but shall be kept to an absolute minimum. All fabrication shall be done under controlled shop conditions when possible.
- 3. Panel lines, breaks, and angles shall be sharp, true, and surfaces free from warp and buckle.
- 4. Maximum deviation from panel flatness shall be 1/8" in 5'-0" on panel in any direction for assembled units (non-accumulative; no oil-canning).

# E. System Characteristics

- Plans, elevations, details, characteristics, and other requirements indicated are based upon standards by one manufacturer. It is intended that other manufacturers, receiving prior approval, may be acceptable, provided their details and characteristics comply with size and profile requirements, and material performance standards.
- 2. System must not generally have any visible fasteners, telegraphing or fastening on the panel faces or any other compromise of a neat and flat appearance.
- 3. System shall comply with the applicable provisions of the "Metal Curtain Wall, Window, Storefront, and Entrance Guide Specifications Manual" by AAMA and ANSI/AAMA 302.9 requirements for aluminum windows.
- 4. Fabricate panel system to dimension, size, and profile indicated on the drawings based on a design temperature of 70 deg. F.
- 5. Fabricate panel system so that no restraints can be placed on the panel, which might result in compressive skin stresses. The installation detailing shall be such that the panels remain flat regardless of temperature change and at all times remain air and water tight.
- 6. The finish side of the panel shall have a removable plastic masking applied prior to fabrication, which shall remain on the panel during fabrication, shipping, and erection to protect the surface from damage.

# F. System Type

1. Rout and Return Dry

- a. System must provide a perimeter aluminum extrusion with integral weatherstripping as detailed on drawings.
- b. No field sealant required in joints unless specifically noted on drawings.

# G. System Performance

 Composite panels shall be capable of withstanding building movements and weather exposures based on the following test standards required by the Architect and/or the local building code.

### a. Wind Load

- If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third party laboratory, which show compliance to the following minimum standards:
- 2). Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 30 lb/ft². Wind load testing shall be conducted in accordance with ASTM E 330 to obtain the following results:
  - (a). Normal to the plane of the wall between supports, deflection of the secured perimeter-framing members shall not exceed L/175 or ¾", whichever is less.
  - (b). Normal to the plane of the wall, the maximum panel deflection shall not exceed L/60 of the full span.
  - (c). Maximum anchor deflection shall not exceed 1/16".
  - (d). At 1-1/2 times design pressure, permanent deflections of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16".

# b. Air/Water System Test

- If system tests are not available, mock-ups shall be constructed and tests performed under the direction of an independent third party laboratory, which show compliance to the following minimum standards:
  - (a). Air Infiltration: Where tested in accordance with ASTM E 283, air infiltration at 1.57 lb/ft² must not exceed 0.06 ft/³ min. per ft² of wall area.
  - (b). Water Infiltration: Water infiltration is defined as uncontrolled water leakage through the exterior face of the assembly. Systems shall be designed to drain any water leakage occurring at the joints. No water infiltration shall occur in any system under a differential static pressure of 6.24 lb/ft² after 15 minutes of exposure in accordance with ASTM E 331.

- 2. Bond Integrity: When tested for bond integrity, in accordance with ASTM D 1781 (simulating resistance to panel delamination), there shall be no adhesive failure of the bond a) between the core and the skin nor b) cohesive failure of the core itself below the following values:
  - a. Peel Strength: 22.5 in lb/in as manufactured; 22.5 in lb/in after 21 days soaking in water at 70 deg. F.

## 3. Fire Performance

- a. Per ASTM E 84, max. flame spread 25, max. smoke developed 450
- b. Per NFPA 285, panels shall meet requirements of the Intermediate Scale Multi Story Test.
- Soffit panel system shall be classified per UL 580, Class 30 pressure (or greater if required by Code) for both uplift and downlift stresses. Deflection of soffit not to exceed L/360.
- H. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm or thicker.
  - 1. Color: As selected by the Architect from manufacturer's full range.

### 2.3 ACCESSORIES

- A. Extrusions, formed members, copings, trim, sheet, and plate shall conform with ASTM B 209 and the recommendations of the manufacturer.
- B. Panel stiffeners, if required, shall be structurally fastened or restrained at the ends and shall be secured to the rear face of the composite panel with silicone of sufficient size and strength to maintain panel flatness. Stiffener material and/or finish shall be compatible with the silicone.
- C. Gaskets within the panel system shall be as per manufacturer's standards to meet performance requirements.
- D. Fabricate flashing materials from 0.030" minimum thickness aluminum sheet painted to match the adjacent panel system where exposed. Provide a lap strap under the flashing at abutted conditions and seal lapped surfaces with a full bed of non-hardening sealant meeting requirements of Section 07900.
- E. Fasteners: Non-corrosive fasteners as recommended by panel manufacturer. Do not expose fasteners.
  - 1. Fasteners shall be secure to cold-formed metal framing, not sheathing.
- F. Attachment system shall allow for the free and noiseless vertical and horizontal thermal movement due to expansion and contraction for a material temperature range

- of –20 deg. F to +180 deg. F. Buckling of panels, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement will not be permitted.
- G. Do not cut, trim, weld, or braze component parts during erection. Return component parts which require alteration to shop for refabrication, or for replacement with new parts.
- H. Separate dissimilar metals and use gasketed fasteners where needed to eliminate the possibility of corrosive or electrolytic action between metals.
- I. Accessories for Soffit Panels
  - Provide aluminum direct-hung suspension system complete with sub-members, hangers, clips, accessories and trim, of the sizes and strengths required to accommodate and support the soffit units and other work supported by the system; with deflections limited to 1/360 of spans (between support points of members). Provide exposed moldings, finished to match panels.
  - 2. Provide clips and inserts to receive hangers, type as recommended by manufacturer, sized for pull-out resistance of not less than 5 times the hanger design load as indicated in ASTM C635, Table 1, Direct Hung.
  - 3. Suspension system deflection shall be limited to 1/360 of span.
  - 4. For circular penetrations of soffits, provide edge moldings fabricated to diameter required to fit penetration exactly.

# PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where aluminum composite wall panels are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

# 3.2 INSTALLATION OF WALL PANELS

- A. Install panels and related components in strict accordance with manufacturer's instructions and approved shop drawings. Installation shall be performed under experienced supervision authorized by the manufacturer.
- B. All supports and fastenings shall be protected against corrosion and the effects of moisture.

- C. Each unit shall be accurately and securely erected, lined up with relations to adjoining parts, with all joints plumb, level and true within the limits as set by the flatness of the panels and the general contour of the building.
- D. Dented, sprung, bent, chipped or otherwise face damaged units will not be accepted and, if erected must be replaced by undamaged units at no additional cost to the Owner.
- E. Installation Tolerances: Align panels within 1/8" of 20'-0" on level/plumb and location. Hold surface plane of adjacent panel within 1/32" tolerance.
- F. The work shall be designed to accommodate all tolerances and anticipate dead and live load movement, creep, sway and torsion of the structure without any harmful effects.

### 3.3 INSTALLATION OF SOFFIT PANELS

- A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of soffit panels.
- B. Measure soffit area and establish layout of metal panel units to balance border widths at opposite edges of soffit. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.
- C. Codes and Standards: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations and industry standards.
- D. Install suspension systems to comply with ASTM C636, as applicable, with hangers supported only from building structural members. Locate hangers not less than 6" from each end and spaced 3'-0" along direct-hung runner, leveling to tolerance of 1/8" in 12'-0". Provide additional hangers at locations where imposed loads or wind uplift could cause deflection exceeding L/360 span.
- E. Secure hangers by anchoring either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.
  - Install hangers plumb and free from contact with insulation or other objects within soffit plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, reinforcing, countersplaying or other equally effective means.
- F. Install edge moldings at perimeter of soffit area and at locations where necessary to conceal edges of metal panel units.

- 1. Attach moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely. Fasteners shall be concealed.
- G. Scribe and cut metal units for accurate fit at borders and at interruptions and penetrations by other work through the ceilings. Stiffen edges of cut units as required to eliminate evidence of oil-canning or buckling.
- H. Install snap-in units in coordination with suspension system and exposed moldings.
  - 1. Align joints in adjacent courses to form uniform, straight joints.
  - 2. Fit adjoining metal panels to form flush, tight joints. Scribe and cut for accurate fit at borders and around work which penetrates soffit.
- I. Light fixtures or other ceiling apparatus shall not be supported from main beams or cross tees if their weight causes the total load to exceed the deflection capability of the ceiling suspension system. In such cases the load shall be supported by supplementary hangers furnished and installed by this Section of work.

# 3.4 ADJUSTING AND CLEANING

- A. Remove and replace panels damaged as a direct result of the panel installation.
- B. Remove masking as directed by the Architect. After removal, clean panels to the satisfaction of the Architect.
- C. Make sure drainage channels are unobstructed and free of dirt and sealants.

**END OF SECTION** 

#### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the PVC roofing, roof insulation and sheet metal work as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Adhered polyvinyl chloride (PVC) roofing system.
  - 2. Vapor retarder.

- 3. Roof insulation.
- 4. Structural roof deck at canopy.

### 1.3 RELATED SECTIONS

- A. General Statement for FM Global Checklist for Roofing Systems Section 00 30 60.
- B. FM Global Checklist for Roofing Systems Section 50 60 00
- C. Steel Decking Section 053100.
- D. Sheet Metal Flashing Section 076200.
- E. Drains and vents Division 22.

### 1.4 DESCRIPTION OF THE SYSTEM

A. The membrane roofing system specified herein shall consist of factory fabricated large sections of sheet membrane fully adhered over the rigid roof insulation. Provide flashing at roof penetrations and vertical surfaces.

### 1.5 QUALITY ASSURANCE

#### A. Qualifications

- The membrane roofing system specified herein shall be the product of a manufacturer who can furnish supporting evidence of experience in the manufacture of the membrane roofing system and of having been regularly engaged in this business for not less than five (5) years. Such experience shall be in projects similar to the requirements and scope for this project.
- 2. The details and specifications are based on a particular manufacturer. It is not the intention of this specification to restrict competition. If a manufacturer other than the basis of design is selected, it shall be his obligation and responsibility to modify and adjust his materials to suit the encountered conditions and to consult and coordinate his work with other trade Contractors to assure that the installation will be watertight and function for use intended and that the guarantee will be issued to the Owner.
- B. Installer: A firm with not less than 5 years of successful experience in installation of roofing systems similar to those required for this project and which is acceptable to or licensed by the manufacturer of the primary roofing materials.
- C. UL Listing: Provide system which has been tested and listed by UL for application indicated and which has a "Class A" rating.
- D. The roofs shall have the following minimum wind uplift ratings per FM Global Data Sheet 1-28:

- 1. Roof Area, Field (psf), Perimeter (psf), Corner (psf)
  - a. Theater Upper Roof, 105, 150, 210
  - b. Theater Lower Roof, 90, 135, 195
- 2. Student Center Dining Roof, 75, 135, 195
- 3. Student Center Lower Roof, 75, 135, 195
- 4. Please note that prescriptive enhancements for the perimeter and corner areas per Data Sheet 1-29, Roof Deck Securement and Above-Deck Roof Components are allowed for the Student Center roofs only. Prescriptive enhancements cannot be performed on the theater roofs due to the uplift ratings needed for the field of roof.
- 5. The perimeter and corners are defined per FM Global Data Sheet 1-28 as follows:
  - a. Roof Area, Perimeter, Corner
    - 1). Theater Upper Roof, 4 ft., 4 x 4 ft.
    - 2). Theater Lower Roof, 6 ft., 6 x 6 ft.
    - 3). Student Center Dining Roof, 4 ft., 4 x 4 ft.
    - 4). Student Center Lower Roof, 4 ft., 4 x 4 ft.

### 1.6 SUBMITTALS

4.

- A. The samples and certificates listed below are required to be submitted by the Contractor to the Architect, for review. An omission of an item or items does not relieve the Contractor from this responsibility and for compliance with the Contract Documents, of which this is a part.
  - 1. Samples

2.	Item No.		Size	Description
	a. b.	S1 S2	6" x 6" 6" x 6"	Membrane w/splice
	D. C.	S2 S3	6" x 6"	Rigid insulation Flashing materials

3. Notarized Certificates of Compliance

Item No.	Description	Standard
a. C1 b. C2		As specified published specifications which shall preparation of surfaces and application
c. C3	Submit a letter from me	embrane manufacturer issuing sample the applicator, prior to pre-application

- B. Submit complete shop drawings showing details, dimensions, fabrication and fastening elements for each condition encountered, layout of each sheet noting seam locations, perimeter and penetration flashing, and other details where roofing abuts other materials and/or conditions.
- C. Submit copies of pre-roofing conference records.
- D. Submit a letter signed by the manufacturer and Contractor acknowledging that the submitted roofing system complies with ASCE-7 and FM requirements specified above based on height and geographic location of project.
- E. Submit FM Global Checklist for Roofing Systems.

# 1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type and brand. Delivered materials shall match approved samples. Fire classification labels shall be intact and visible.
- B. Store materials under cover in a dry and clean location, off the ground and remove materials which are damaged, torn or otherwise not suitable for installation and replace with acceptable materials.
- C. Keep insulation and membrane dry before and during installation. Remove wet materials from project site.
- D. Store roofing materials on platforms or pallets, above ground, on roof level and cover with tarpaulins or on other suitable watertight covering. Store membrane and handle, in such a way as to prevent damage to edges or ends.

## 1.8 PREROOFING CONFERENCE

- A. Prior to ordering of materials, a preroofing conference will be held to discuss the specified roofing system and its proper application. Conference shall include installer, roofing manufacturer, installers of related work, Architect and representatives of Owner. Record discussions and agreements and furnish copy to each participant. Provide at least 72 hours advance notice to participants prior to convening conference.
- B. Coordinate application of the roofing system in such a manner that the complete installation is weather-tight and in accordance with guarantee requirements.

# 1.9 ENVIRONMENTAL REQUIREMENTS

A. Work shall not be installed when the roof deck is damp, wet or spotted with frost or if the ambient temperature is 35 deg. F. and falling or if there is a forecast for inclement weather which will be adverse to the proper installation of the roofing system.

## 1.10 WARRANTY

- A. Provide manufacturer's 30 year Total System Warranty covering both labor and material with no dollar limitation. Certification is required with project submittals indicating the manufacturer has reviewed and agreed to such wind coverage.
- B. Warranty shall be in a form acceptable to the Architect and shall be duly executed by officers or principals of the manufacturer.
- C. Contractor shall inform the Architect if conditions exist which will interfere with issuance of the specified warranty. Start of work shall imply that the warranty as specified above will be issued.
- D. In addition to manufacturer's warranty, provide roofing Installer's warranty effective for a period of two (2) years from date of Substantial Completion.

# PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. PVC Adhered Roof Membrane System:
  - 1. Carlisle Syntec "Sure-Flex KEE HP" (Basis of Design)
  - 2. Sika Sarnafil " G410 Energysmart Roof Membrane"
  - 3. Flex "MF/R 80 PVC Roof Membrane"

### 2.2 MATERIALS

- A. Membrane: 80-mil thick, white, fabric-reinforced PVC (polyvinyl chloride) membrane.
- B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as membrane.
- C. Bonding Adhesive: Manufacturer's standard, low-VOC, solvent-based adhesive.
- D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1" x 1/8" thick; with anchors.
- E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roofing to substrate, and acceptable to roofing system manufacturer.
- F. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

- G. Vapor Retarder: Self-adhering-sheet vapor retarder conforming to ASTM D 1970, polyethylene film laminated to layer of rubberized asphalt adhesive, minimum 40 mils total thickness; maximum permeance rating of 0.05 or less per ASTM E 90; cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor-retarder manufacturer.
- H. Insulation: Polyisocyanurate board insulation conforming to ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces, 20 psi minimum.
  - 1. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4" per foot, unless otherwise indicated.
  - 2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

# I. Insulation Accessories

- 1. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with roofing.
- Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Global 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer; twocomponent, insulating urethane adhesive two-component, construction-grade, low-rise, expanding polyurethane adhesive designed for bonding insulation to various substrates.
- J. Cover Board: Provide minimum 3/8" thick glass-mat, water-resistant gypsum substrate board conforming to ASTM C 1177.
- K. Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway rolls, approximately 3/16" thick and acceptable to roofing system manufacturer.
- L. Canopy Structural Deck Board: USG Structural Panel Concrete Roof Deck or approved equal by Ameriform Armortec, USAP Versaroc or approved equal.
  - Classification: A noncombustible concrete subfloor manufactured in accordance with Acceptance Criteria AC318.
  - 2. Thickness: 3/4 inch (19 mm)
  - 3. Width: 4 foot (1220 mm)
  - 4. Edges: Tongue and Groove.

5. USG Structural Panel Concrete Roof Deck Fasteners: USG Structural Panel Screw #8 x 1-5/8" (41 mm) with GrabberGard – Collated Item Numbers: CGH8158LG, CHS8158JBWG2

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
  - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
  - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
  - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."
  - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
  - 5. Verify that concrete substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
  - 6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

# 3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Install roofing and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition and to not void warranty for existing roofing system.

#### 3.4 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.

# 3.5 VAPOR-RETARDER INSTALLATION

- A. Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2" and 6", respectively. Seal laps by rolling.
- B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into roofing system.

# 3.6 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.6" or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6" in each direction.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4" with insulation.
  - 1. Cut and fit insulation within 1/4" of nailers, projections, and penetrations.

# 3.7 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere roofing over area to receive roofing according to roofing system manufacturer's written instructions. Unroll roofing and allow to relax before installing.
- B. Start installation of roofing in presence of roofing system manufacturer's technical personnel.

- C. Accurately align roofing, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Bonding Adhesive: Apply to substrate and underside of roofing at rate required by manufacturer, and allow to partially dry before installing roofing. Do not apply to splice area of roofing.
- E. In addition to adhering, mechanically fasten roofing securely at terminations, penetrations, and perimeter of roofing.
- F. Apply roofing with side laps shingled with slope of roof deck where possible.
- G. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roofing and sheet flashings according to manufacturer's written instructions, to ensure a watertight seam installation.
  - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet.
  - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
  - 3. Repair tears, voids, and lapped seams in roofing that do not comply with requirements.
- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roofing in place with clamping ring.

# 3.8 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

# 3.9 WALKWAY INSTALLATION

A. Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

### 3.10 FIELD QUALITY CONTROL

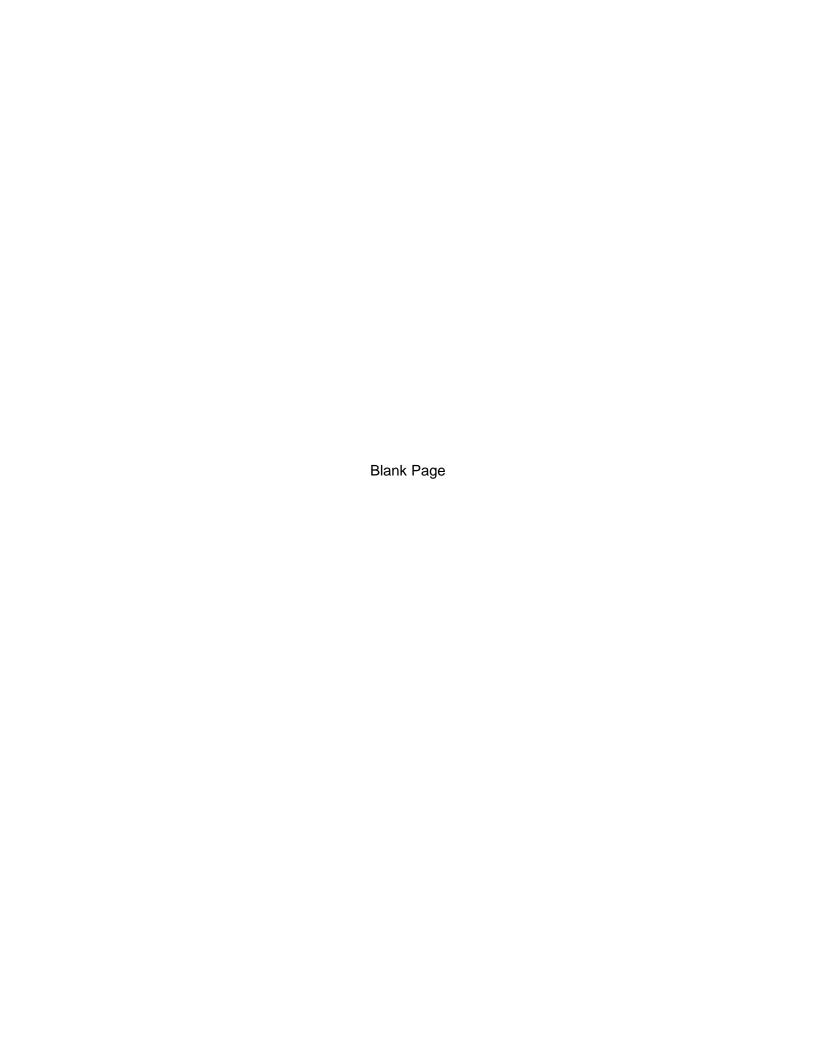
- A. Testing Agency: Engage a qualified testing agency to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Flood Testing: Flood test each roofing area for leaks, according to recommendations in ASTM D 5957, after completing roofing and flashing but before overlying construction is placed. Install temporary containment assemblies, plug or dam drains, and flood with potable water.
  - 1. Flood to an average depth of 2-1/2" with a minimum depth of 1" and not exceeding a depth of 4". Maintain 2" of clearance from top of base flashing.
  - 2. Flood each area for 48 hours.
  - 3. After flood testing, repair leaks, repeat flood tests, and make further repairs until roofing and flashing installations are watertight.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.
- F. Final Acceptance of roof covering installation shall be conditional to successful uplift testing by Testing Agency in accordance with FM Global Data Sheet 1-52, Field Verification of Roof Wind Uplift Resistance. Test shall be witnessed by the owner's representative. An acceptable alternative to negative uplift testing is to use full-time visual construction observation (VCO) during the roofing system installation. Observation and recording per FM Global Data Sheet 1-52, Section 3.5.

## 3.11 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

**END OF SECTION** 



### **PART 1 GENERAL**

### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the sheet metal flashing as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Stainless steel cap metal flashing.
  - 2. Stainless steel through-wall flashing.
  - 3. Field fabricating (including bending, cutting, soldering, etc.), if required, of stainless steel flashing.

- 4. Stainless steel flashing elsewhere, where metal flashing is indicated on drawings.
- 5. Separation of contacting surfaces of dissimilar metals.

#### 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Roofing Division 7.

#### 1.4 SUBMITTALS

- A. Shop Drawings: Submit, showing all materials, finishes, fastenings, joint details, fabrication, construction and relation to adjoining construction.
- B. Samples: Submit 12" x 12" samples of flashing materials and finishes.

# 1.5 WARRANTY

A. The Contractor shall warrant that all Metal Flashing Work executed under this Section will be free from defects in materials and workmanship for a period of ten (10) years from date of acceptance of the Project, and he shall remedy any defects in the Metal Flashing Work.

#### 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.

#### 1.7 QUALITY ASSURANCE

A. All flashing should be FM Approved and all perimeter nailers should be designed and installed in accordance with FM Global Data Sheet 1-49.

## PART 2 PRODUCTS

### 2.1 MATERIALS

- A. Stainless Steel Flashing Materials
  - Stainless Steel Flashing: ASTM A 240, Type 304, stainless steel, with 2D finish, dead soft temper, fully annealed, as manufactured by International Nickel Co., Republic Steel Corp., United States Steel, or Washington Steel Corp. Thickness of stainless steel shall be as listed below.
    - a. Concealed Flashings: 0.012" thick, thirty (30) gauge (U.S. Standard).
    - b. Exposed Flashings: 0.015" thick, twenty-eight (28) gauge (U.S. Standard).

- c. Edge Strips: 0.025" thick, twenty-four (24) gauge (U.S. Standard).
- 2. Through-wall flashing shall have sawtooth ribs at three (3) inch interval as manufactured by Keystone Flashing Co., Hohmann & Barnard or Cheney Flashing Co.
- 3. Accessories and Fastenings: AISI, Types 302 and 304 stainless steel.
- 4. Solder: Composed of sixty (60) percent block tin and forty (40) percent pig lead, except that solder at seams exposed to public view shall be eighty (80) percent tin and twenty (20) percent lead.
- 5. Flux: An acid type flux manufactured specifically for soldering stainless steel, as approved.
- B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where sheet metal flashing is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 METAL FLASHING INSTALLATION

- A. Reference Standard: Conform to the requirements of 7<sup>th</sup> Edition of the Sheet Metal and Air Conditioning Contractors Association (SMACNA) Architectural Sheet Metal Manual.
- B. General: Fabricate and install metal flashing work in accordance with details and specifications of above Reference Standard, with manufacturer's instructions, and as herein specified, to provide a watertight installation. Apply metal flashing to smooth, even, sound, clean, dry surfaces free from defects. Make provisions to allow for expansion and contraction of metal flashing work. Wherever practicable, shop form all metal flashing work and deliver ready for installation. Form metal flashing work accurately to required profiles, with flat surfaces, straight edges and corners, free from defects. Fold exposed metal edges back not less than 1/2" and form drip.
- C. Nailing: Confine to sheets twelve (12) inches or less in width. Confine nailing to one edge only, locate nails where concealed. Use No. 12 x 1" long flat headed, annular threaded, Type 302 stainless steel nails for nailing to wood blocking; use one (1) inch long masonry nails for nailing to concrete. Space nails four (4) inches o.c. maximum.
- D. Cleating: Use cleats where sheets are more than twelve (12) inches in width. Space cleats approximately twelve (12) inches o.c. Cleats two (2) inches wide by three (3) inches long, of the same material and weight as the metal flashing being installed. Secure one end of the cleat with

- two (2) nails and fold edge back over the nail heads. Lock other end into seam or into folded edge of metal flashing sheets. Pre-tin cleats for soldered seams.
- E. Joining: Join metal flashings with one (1) inch locked and soldered seams except at slip joints. Mallet seams flat and solder full length of seam as specified below.
- F. Soldering: Clean and pre-tin edges of metal flashing to be soldered before soldering is begun with solder on both sides for a width of not less than 1-1/2". Solder slowly with well heated metal surfaces. Use ample solder. Show not less than one full inch of evenly flowed solder on seam. Seams shall have a liberal amount of flux brushed in before soldering is commenced. Where soldering paste or killed acid is employed as a flux, soldering shall follow immediately after application of the flux. Upon completion of soldering, clean surfaces of all flux.
- G. Slip Joints: Locate slip joints not more than twenty-four (24) feet apart and not more than eight (8) feet from corners. Form slip joints as three (3) inch wide joints with cover piece behind flashing, and fill locked ends neatly with sealant.
- H. Cap Flashing: Install over base flashings, in eight (8) to ten (10) foot lengths, lapped six (6) inches at ends. Cap flashing shall be increased longitudinally to produce spring action to hold bottom edge of cap flashing firmly against base flashing. Cap flashing shall lap base flashing at least four (4) inches, with exposed bottom edge at a forty-five (45) degree angle downward and folded back on underside at least 1/2" to form drip. Make cap flashing continuous at corners and angles.
- I. Miscellaneous Flashing: Provide all other miscellaneous metal flashing not specifically mentioned herein, but indicated on drawings and/or required to provide a watertight installation.
- J. Separation of Dissimilar Materials: Back paint surfaces of metal flashing in contact with dissimilar metals or with concrete or masonry with bituminous paint.

# K. Reglets

- 1. Provide watertight reglets in masonry and concrete work to receive cap flashing. Form reglets of stainless steel using same thickness as stainless steel sheet metal specified.
- 2. In masonry work use open or closed slot reglets with slat at least one (1) inch deep and 3/16" wide. Provide hook dams or turn-ups for anchoring securely into mortar joints. Insert cap flashing into slot full depth using button punch or lead wedges to lock in place.
- 3. In concrete work, use open or closed slot reglets with slot sloped upward at forty-five (45) degrees, at least one (1) inch deep and 3/16" wide. For fastening reglets to concrete forms use double-head stainless steel nails spaced twelve (12) inches apart maximum.
- 4. Insert cap flashing full depth into reglet slot, and wedge in place using lead strips spaced on twelve (12) inch centers maximum or lead caulking rope. When lead strips are used for continuous caulked reglets, use approved weather-resistant fibrous compounds.

L. Through-Wall Flashings: Provide through-wall flashings as shown. Form bonding features so as not to puddle water on surface. Lap cross joints to interlock design pattern at least three (3) inches. Stop typical flashings in mortar joint 1/2" from exterior face of wall.

**END OF SECTION** 



#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the roof specialties and accessories as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Aluminum copings.

- 2. Roof hatches.
- 3. Roof smoke vents.

### 1.3 RELATED SECTIONS

- A. Miscellaneous Metals Section 055000, for prefabricated aluminum ship's ladders.
- B. Roofing Section 075416.
- C. Sheet Metal Flashing Section 076200.

## 1.4 SUBMITTALS

A. Before any roof specialties and accessories are delivered to the job site, submit shop drawings showing profiles and anchoring devices.

### 1.5 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

# PART 2 PRODUCTS

## 2.1 ALUMINUM COPINGS

- A. Fabricate of 0.125" thick aluminum alloy 5005-H154, smooth, no pattern.
- B. Provide concealed splice plates 12'-0" o.c. fabricated of 0.050" thick aluminum to match exposed aluminum; finished to match exposed aluminum.
- C. Provide pre-fabricated mitered and welded corner units.
- D. Provide galvanized steel anchor plates, anchors spaced 6'-0" o.c. and snap-lock coping design; all anchors concealed.
- E. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
  - Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color

topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-02.

- 2. Custom color and gloss as selected by the Architect.
- F. Provide units manufactured by Hickman, or Cheney, Johns Manville.
- G. Conform to wind resistance requirements in accordance with ANSI/SPRI ES-1. Theatre lower roof and Student Center roof shall be installed in accordance with FM Global Data Sheet 1-49, *Perimeter Flashing*. Theatre upper roof flashing shall be FM Global approved for a minimum wind uplift rating of 105.

## 2.2 ROOF HATCH

- A. Provide shop-primed, galvanized steel roof hatch units of sizes shown on drawings, with 1" rigid insulation at curbs and door and standard self-lifting mechanism. Provide manufacturer's standard hardware, including hold-open device, hinges, latch and operating handles for inside operation. Construct units for 40 lbs. per sq. ft. live load.
  - 1. Field paint roof hatch in accordance with requirements of Section 099000, color as selected by the Architect.
- B. Safety Railing System: Manufacturer's standard complete system including rails, clamps, fasteners, safety barrier at railing opening, and all accessories required for a complete installation.
  - 1. Height: 42 inches above finished roof deck.
  - 2. Test load per code requirements.
  - 3. Provide self-latching gate fabricated of same materials as safety railing system.
- C. Provide units manufactured by Bilco, Babcock-Davis, or Milcor.
- D. For access to roof hatch, size 30" x 54", provide aluminum ship's ladder per Section 055000.

## 2.3 SMOKE VENTS

- A. Provide shop primed galvanized steel heat and smoke vent units of sizes shown on drawings, with 1" rigid insulation at curbs and door, standard lifting mechanism and automatic heat and smoke sensitive release devices. Provide manufacturer's standard hardware including hold-open device, hinges, latch and operating handles for inside and outside operation.
- B. Provide units manufactured by Bilco, Babcock-Davis, or Milcor.

### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where roof specialties and accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION

- A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weathertight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
- B. Isolation: Where metal surfaces of units are to be installed in contact with non-compatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- C. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.
- D. Operational Units: Test operational units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

## 3.3 CLEANING AND PROTECTION

A. Clean exposed metal surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.

**END OF SECTION** 

#### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the firestops and smokeseals as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Penetrations through fire-resistance-rated floor and roof construction including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.

- 2. Penetrations through fire-resistance-rated walls and partitions including both empty openings and openings containing cables, pipes, ducts, conduits, and other penetrating items.
- 3. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
- 4. Sealant joints in fire-resistance-rated construction.
- 5. Penetrations at each floor level in shafts and/or stairwells.
- 6. Construction joints, including those between top of fire rated walls and underside of floors above; and those between exterior curtain walls and the outer perimeter edge of floor assemblies.

## 1.3 RELATED SECTIONS

- A. Cast-in-Place Concrete Section 033000.
- B. Unit Masonry Section 042000.
- C. Joint Sealers Section 079200.
- D. Glazed Aluminum Curtain Wall Section 084413.
- E. Gypsum Drywall Section 092900.
- F. Piping penetrations Division 22.
- G. Duct penetrations Division 23.
- H. Cable and conduit penetrations Division 26.

# 1.4 REFERENCES

- A. ASTM E 814 "Standard Method of Fire Tests of Through-Penetration Firestops."
- B. UL 1479, UBC 7-5 (Both are same as A. above).
- C. ASTM E 119 "Standard Method of Fire Tests of Building Construction and Materials."
- D. UL 263, UBC 7-1 (Both are same as C. above).
- E. UL 2079 "Tests For Fire Resistance of Building Joint Systems."
- F. ASTM E 1399 "Test For Dynamic Movement Conditions."
- G. ASTM E 1966 (Same as E. above).

- H. ASTM G 21 "Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi."
- I. Test Requirements: ASTM E 2307, "Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus."
- J. Inspection Requirements: ASTM E 2174, "Standard Practice for On-site Inspection of Installed Firestops."
- K. Published Through-Penetration Systems by recognized independent testing agencies.
  - 1. UL Fire Resistance Directory, Volume II of current year.
  - 2. Warnock Hersey Certification Listings, current year.
  - 3. Omega Point Laboratories, current year.
- L. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.

### 1.5 SUBMITTALS

- A. Submit manufacturer's product literature for each type of firestop material to be installed. Literature shall indicate product characteristics, typical uses, performance, limitation criteria, test data and indication that products comply with specified requirements.
- B. Submit shop drawings detailing materials, installation methods, and relationships to adjoining construction for each firestop system, and each kind of construction condition penetrated and kind of penetrating item. Include firestop design designation of qualified testing and inspection agency evidencing compliance with requirements for each condition indicated.
  - 1. Submit documentation, including illustrations, for proposed UL listed (or equal) firestop and smokeseal assembly required for the Project.
- C. Material Safety Data Sheets: Submit MSDS for each firestop product.
- D. Submit qualifications of firestop installer, including letter from firestop manufacturer of products proposed to be installed, wherein manufacturer approves or recognizes as trained/ or certifies installer for installation of that manufacturer's products.
- E. Engineering Judgment: For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified tested system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment documents must follow requirements set forth by the International Firestop Council.

## 1.6 QUALITY ASSURANCE

- A. All firestopping assemblies and material shall be FM Global approved.
- B. General: Provide firestopping systems that are produced and installed to resist the spread of fire and the passage of smoke and other gases.
- C. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor.
- D. Firestopping materials shall conform to Flame (F) and Temperature (T) ratings as required by local building code and as tested by nationally accepted test agencies per ASTM E 814 or UL 1479. The F-rating must be a minimum of one (1) hour, but not less than the fire resistance rating of the assembly being penetrated. T-rating, when required by code authority, shall be based on measurement of the temperature rise on the penetrating item(s). The fire test shall be conducted with a minimum positive pressure differential of 0.01 inches of water column.
  - 1. Penetrations in Horizontal Assemblies: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
    - a. F-Rating: Minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
    - b. T-Rating: When penetrant is located outside of a wall cavity, minimum of 1-hour rating, but not less than the fire-resistance rating of the floor construction being penetrated.
    - c. W-Rating: Class 1 rating in accordance with water leakage test per UL 1479.
  - 2. Penetrations in Smoke Barriers: Provide firestopping with ratings determined in accordance with UL 1479 or ASTM E 814.
    - a. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at both ambient and elevated temperatures.
- E. Firestopping products shall be asbestos free and free of any PCBs.
- F. Do not use any product containing solvents or that requires hazardous waste disposal.
- G. Do not use firestop products which after curing, dissolve in water.
- H. Do not use firestop products that contain ceramic fibers.
- I. Firestopping Installer Qualifications: Firestop application shall be performed by a single firestopping contractor who specializes in the installation of firestop systems, whose personnel to be utilized have received specific training and certification or approval from the proposed respective firestop manufacturer, and firestop installer shall have a minimum of three years experience (under present company name) installing firestop systems of the type herein specified.

- J. Mock-Up: Prepare job site mock-ups of each typical Firestop System proposed for use in the project. Approved mock-ups will be left in place as part of the finished project and will constitute the quality standard for the remaining work.
- K. For firestopping exposed to view, traffic, moisture, and physical damage, provide products that do not deteriorate when exposed to these conditions.
  - For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
  - For floor penetrations with annular spaces exceeding 4 inches or more in width and exposed to possible loading and traffic, provide firestop systems capable of supporting the floor loads involved either by installing floor plates or by other means.
  - 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- L. Mold Resistance: Provide penetration firestopping with mold and mildew resistance rating of less than or equal to 1 as determined by ASTM G 21.
- M. Firestopping Materials are either "cast-in-place" (integral with concrete placement) or "post-installed." Provide cast-in-place firestop devices prior to concrete placement.
- N. Firestop systems do not reestablish the structural integrity of load bearing partitions or assemblies, or support live loads and traffic. Installer shall consult the Structural Engineer prior to penetrating any load bearing assembly.

# 1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original unopened containers with manufacturer's name, product identification, lot numbers, UL or Warnock Hersey labels, and mixing and installation instructions, as applicable.
- B. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.
- C. All firestop materials shall be installed prior to expiration of shelf life.

# 1.8 PROJECT CONDITIONS

- A. Verify existing conditions and substrates before starting work
- B. Do not use materials that contain solvents, show sign of damage or are beyond their shelf life.
- C. During installation, provide masking and drop cloths as needed to prevent firestopping products from contaminating any adjacent surfaces.

- D. Conform to ventilation requirements if required by manufacturer's installation instructions or Material Safety Data Sheet.
- E. Weather Conditions: Do not proceed with installation of firestop products when temperatures are in excess or below the manufacturer's recommendations.
- F. Schedule installation of firestop products after completion of penetrating item installation but prior to covering or concealing of openings.
- G. Coordinate this work as required with work of other trades.

# 1.9 SEQUENCING AND SCHEDULING

- A. Pre-Installation Conference: Convene a pre-installation conference to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
- B. Sequence: Perform work of this and other sections in proper sequence to prevent damage to the firestop systems and to ensure that their installation will occur prior to enclosing or concealing work.
- C. Install all firestop systems after voids and joints are prepared sufficiently to accept the applicable firestop system.
- Do not cover firestop systems until they have been properly inspected and accepted by the authority having jurisdiction.

# PART 2 PRODUCTS

# 2.1 ACCEPTABLE MANUFACTURERS

- A. Subject to compliance with requirements, provide products of one of the following manufacturers:
  - 1. Tremco
  - 2. Bio-Fireshield
  - 3. 3M
  - 4. Specified Technologies Inc.
  - 5. U.S. Gypsum Co.
  - 6. Nelson
  - 7. Hilti, Inc.
  - 8. Grace Flame Safe

## 2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by firestopping manufacturer based on testing and field experience.
- B. Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fireresistance-rated systems. Accessories include but are not limited to the following items:
  - 1. Permanent forming/damming/backing materials including the following:
    - a. Semirefractory fiber (mineral wool) insulation.
    - b. Sealants used in combination with other forming/damming materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Joint fillers for joint sealants.
  - 2. Temporary forming materials.
  - 3. Substrate primers.
  - 4. Collars.
  - 5. Steel sleeves.
- C. Applications: Provide firestopping systems composed of materials specified in this Section that comply with system performance and other requirements.
- D. Smokeseals at top of partitions shall be flexible to allow for partition deflection.
- E. Polypropylene Sleeves (PP) (for cast-in device options)

## 2.3 FILL MATERIALS FOR THROUGH-PENETRATION FIRESTOP SYSTEMS

- A. Endothermic, Latex Compound Sealant: Single-component, endothermic, latex formulation.
- B. Intumescent, Latex Sealant: Single-component, Intumescent, latex formulation.
- C. Intumescent Putty: Non-hardening, dielectric, water-resistant putty containing no solvents, inorganic fibers, or silicone compounds.
- D. Intumescent Wrap Strips: Single-component, elastomeric sheet with aluminum or polyethelene foil on one side.

- E. Job-Mixed Vinyl Compound: Prepackaged vinyl-based powder product for mixing with water at Project site to produce a paintable compound, passing ASTM E 136, with flame-spread and smoke-developed ratings of zero per ASTM E 84.
- F. Mortar: Prepackaged dry mix composed of a blend of inorganic binders, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- G. Pillows/Bags: Re-usable, heat-expanding pillows/bags composed of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- H. Silicone Foam: Two-component, silicone-based liquid elastomer that, when mixed, expands and cures in place to produce a flexible, non-shrinking foam.
- I. Silicone Sealant: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealant of grade indicated below:
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping/gunnable sealant, unless firestop system limits use to non-sag grade for both opening conditions.
- J. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic or polyprolyene sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- K. Fire Rated Cable Management Devices: Factory-assembled round metallic sleeve device for use with cable penetrations, containing an integrated smoke seal fabric membrane that can be opened and closed for re-penetration.
- L. Drop-In Firestop Devices: Factory-assembled devices for use with combustible or noncombustible penetrants in cored holes within concrete floors. Device shall consist of galvanized steel sleeve lined with an intumescent strip, an extended rectangular flange attached to one end of the sleeve for fastening to concrete floor, and neoprene gasket.
- M. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- N. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized-steel sheet.
- O. Blocks/Plugs: Intumescent flexible block/plug suitable for reuse in re-penetration of openings. Blocks shall allow up to 12" of unreinforced annular space.
- P. Tub Box Kit: Cast-in place pre-formed plastic tub box kit with three support legs for use with drain piping assembly associated with bathtub installations.

## 2.4 FIRE-RESISTIVE ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated that complies with ASTM C 920 requirements, including those referenced for Type, Grade, Class, and Uses, and requirements specified in this Section applicable to fire-resistive joint sealants.
  - 1. Sealant Colors: Color of exposed joint sealants as selected by the Architect.
- B. Single-Component, Neutral-Curing Silicone Sealant: Type S; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, G, A, and (as applicable to joint substrates indicated) O.
  - Additional Movement Capability: Provide sealant with the capability to withstand 33 percent movement in both extension and compression for a total of 66 percent movement.
- C. Multi-Component, Non-Sag, Urethane Sealant: Type M; Grade NS; Class 25; exposure-related Use NT, and joint-substrate-related Uses M, A, and (as applicable to joint substrates indicated) O.
  - Additional Movement Capability: Provide sealant with the capability to withstand 40 percent movement in extension and 25 percent in compression for a total of 65 percent movement in joint width existing at time of installation, when tested for adhesion and cohesion under maximum cyclic movement per ASTM C 719, and remain in compliance with other requirements of ASTM C 920 for uses indicated.
- D. Single-Component, Non-Sag, Urethane Sealant: Type S; Grade NS; Class 25; and Uses NT, M, A, and (as applicable to joint substrates indicated) O.
- 2.5 MINERAL FIBER/CERAMIC WOOL NON-COMBUSTIBLE INSULATION (FIRE SAFING)
  - A. Provide min. 4 pcf Thermafiber as manufactured by Thermafiber Co., min. 4 pcf FBX Safing Insulation as manufactured by Fibrex, or Roxul Safe Fire Resistant Insulation to suit conditions and to comply with fire resistance and firestop manufacturer's requirements.
  - B. Material shall be classified non-combustible per ASTM E 119.

### 2.6 MIXING

A. For those products requiring mixing prior to application, comply with firestopping manufacturer's directions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other procedures needed to produce firestopping products of uniform quality with optimum performance characteristics for application indicated.

### PART 3 EXECUTION

### 3.1 EXAMINATION

A. Examine substrates and conditions with Installer present, for compliance with requirements for opening configuration, penetrating items, substrates, and other conditions affecting performance of firestopping. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Cleaning: Clean out openings and joints immediately prior to installing firestopping to comply with recommendations of firestopping manufacturer and the following requirements:
  - 1. Remove all foreign materials from surfaces of opening and joint substrates and from penetrating items that could interfere with adhesion of firestopping.
  - 2. Clean opening and joint substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with firestopping. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form release agents from concrete.
- B. Priming: Prime substrates where recommended by firestopping manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent firestopping from contacting adjoining surfaces that will remain exposed upon completion of work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestopping materials. Remove tape as soon as it is possible to do so without disturbing seal of firestopping with substrates.

# 3.3 CONDITIONS REQUIRING FIRESTOPPING

# A. Building Exterior Perimeters

- Where exterior facing construction is continuous past a structural floor, and a space (i.e. construction joint) would otherwise remain open between the inner face of the wall construction and the outer perimeter edge of the structural floor, provide firestopping to equal the fire resistance of the floor assembly.
  - a. If mineral wool is part of firestop system, the mineral wool must be completely covered by appropriate thickness of UL or Warnock Hersey listed firestop sealant or spray.
  - b. Refer to Article 3.6 herein for description of fire safing insulation.

- 2. Firestopping shall be provided whether or not there are any clips, angles, plates, or other members bridging or interconnecting the facing and floor systems, and whether or not such items are continuous.
- 3. Where an exterior wall passes a perimeter structural member, such as a girder, beam, or spandrel, and the finish on the interior wall face does not continue up to close with the underside of the structural floor above, thus interrupting the fire-resistive integrity of the wall system, and a space would otherwise remain open between the interior face of the wall and the structural member, provide firestopping to continuously fill such open space.

## B. Interior Walls and Partitions

- 1. Construction joints between top of fire rated walls and underside of floors above, shall be firestopped.
- 2. Firestop system installed shall have been tested by either UL or Omega Point, including exposure to hose stream test and including for use with steel fluted deck floor assemblies.
- 3. Firestop system used shall allow for deflection of floor above.

## C. Penetrations

- 1. Penetrations include conduit, cable, wire, pipe, duct, or other elements which pass through one or both outer surfaces of a fire rated floor, wall, or partition.
- 2. Except for floors on grade, where a penetration occurs through a structural floor or roof and a space would otherwise remain open between the surfaces of the penetration and the edge of the adjoining structural floor or roof, provide firestopping to fill such spaces in accordance with ASTM E 814.
- These requirements for penetrations shall apply whether or not sleeves have been provided, and whether or not penetrations are to be equipped with escutcheons or other trim. If penetrations are sleeved, firestop annular space, if any, between sleeve and wall of opening.
- D. Provide firestopping to fill miscellaneous voids and openings in fire rated construction in a manner essentially the same as specified herein before.

### 3.4 INSTALLING THROUGH PENETRATION FIRESTOPS

- A. General: Comply with the through penetrations firestop manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install forming/damming materials and other accessories of types required to support fill materials during their application and in the position needed to produce the cross sectional shapes and depths required to achieve fire ratings of designated throughpenetration firestop systems. After installing fill materials, remove combustible forming

- materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for through penetration firestop systems by proven techniques to produce the following results:
  - 1. Completely fill voids and cavities formed by openings, forming materials, accessories, and penetrating items.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

## 3.5 INSTALLING FIRE RESISTIVE JOINT SEALANTS

- A. General: Comply with ASTM C 1193, and with the sealant manufacturer's installation instructions and drawings pertaining to products and applications indicated.
- B. Install joint fillers to provide support of sealants during application and at position required to produce the cross sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability and develop fire resistance rating required.
- C. Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross sectional shapes and depths relative to joint width that optimum sealant movement capability. Install sealants at the same time joint fillers are installed.
- D. Tool no sag sealants immediately after sealant application and prior to the time skinning or curing begins. Form smooth, uniform beads of configuration indicated or required to produce fire resistance rating, as well as to eliminate air pockets, and to ensure contact and adhesion of sealants with sides of joint. Remove excess sealant from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

### 3.6 INSTALLING FIRESAFING INSULATION

- A. Install fire safing insulation utilizing welded or screw applied galvanized steel impaling pins and retaining clips; space clips or pins 24" o.c. maximum.
- B. Completely fill voids in areas where safing insulation is required. At spandrel conditions/floor edges, depth of insulation top to bottom shall be at least four (4) inches.
- C. Cover top of all safing insulation with firestop sealant or spray.

## 3.7 FIELD QUALITY CONTROL

- A. Inspecting agency employed and paid by the Owner will examine completed firestopping to determine, in general, if it is being installed in compliance with requirements.
- B. Inspecting agency will report observations promptly and in writing to Contractor, Owner and Architect.
- C. Do not proceed to enclose firestopping with other construction until reports of examinations are issued.
- D. Where deficiencies are found, Contractor must repair or replace firestopping so that it complies with requirements.

### 3.8 CLEANING

- A. Clean off excess fill materials and sealants adjacent to openings and joints as work progresses by methods and with cleaning materials approved by manufacturers of firestopping products and of products in which opening and joints occur.
- B. Protect firestopping during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated firestopping immediately and install new materials to product firestopping complying with specified requirements.

**END OF SECTION** 



#### PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the joint sealers work as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  - 1. Flashing reglets and retainers.

- 2. Coping joints.
- 3. Exterior wall joints not specified to be sealed in other Sections of work.
- 4. Interior wall joints not specified to be sealed in other Sections of work, including caulking to fill between architectural woodwork and any wall, floor and/or ceiling imperfections.
- 5. Control and expansion joints in walls.
- 6. Joints at wall penetrations.
- 7. Joints between items of equipment and other construction.
- 8. All other joints required to be sealed to provide a positive barrier against penetration of air and moisture.

# 1.3 RELATED SECTIONS

- A. Roofing Division 7.
- B. Firestop sealants Section 078413.
- C. Sealant at metal-to-metal components of curtain wall Section 084413.
- D. Glazing sealants Section 088000.
- E. Sealant within drywall construction Section 092900.
- F. Sealant at tile work Section 093013.
- G. Sealant at paving Division 32.

#### 1.4 QUALITY ASSURANCE

- A. Qualification of Installers: Use only personnel who are thoroughly familiar, skilled and specially trained in the techniques of sealant work, and who are completely familiar with the published recommendations of the sealant manufacturer.
- B. Pre-Construction Field Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to project joint substrates according to the method in ASTM C 794 and C 1521 that is appropriate for the types of Project joints.
- C. Perform testing per ASTM C 1248 on interior and exterior sealants to determine if sealants or primers will stain adjacent surfaces. No sealant work shall start until results of these tests have been submitted to the Architect and he has given his written approval to proceed with the work.

### 1.5 SUBMITTALS

- A. Shop Drawings: Submit shop drawings showing all joint conditions, indicating relation of adjacent materials, all sealant materials (sealant, bond breakers, backing, primers, etc.), and method of installation.
  - 1. Submit joint sizing calculations certifying that movement capability of sealant is not being exceeded.
- B. Samples: Submit the following:
  - 1. Color samples of sealants, submit physical samples (not color chart).
  - 2. Sealant bond breaker and joint backing.
- C. Product Data: Submit manufacturer's technical information and installation instructions for:
  - 1. Sealant materials, indicating that material meets standards specified herein.
  - 2. Backing rods.
- D. Submit manufacturer's certification as required by Article 1.6 herein.
- E. Submit results of testing required in Article 1.4 herein.

# 1.6 MANUFACTURER'S RESPONSIBILITY AND CERTIFICATION

A. Contractor shall require sealant manufacturer to review the Project joint conditions and details for this Section of the work. Contractor shall submit to the Architect written certification from the sealant manufacturer that joints are of the proper size and design, that the materials supplied are compatible with adjacent materials and backing, that the materials will properly perform to provide permanent watertight, airtight or vaportight seals (as applicable), and that materials supplied meet specified performance requirements.

## 1.7 ENVIRONMENTAL CONDITIONS

- A. Temperature: Install all work of this Section when air temperature is above forty (40) degrees F. and below eighty (80) degrees F., unless manufacturer submits written instructions permitting sealant use outside of this temperature range.
- B. Moisture: Do not apply work of this Section on surfaces which are wet, damp, or have frost.

### 1.8 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section, before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

# C. Storage

- 1. Store sealant materials and equipment under conditions recommended by their manufacturer.
- 2. Do not use materials stored for a period of time exceeding the maximum recommended shelf life of the material.
- 3. Material shall be stored in unopened containers with manufacturers' name, batch number and date when shelf life expires.

## 1.9 GUARANTEE

- A. Provide a written, notarized guarantee from the manufacturer stating that the applied sealants shall show no material failure for a period of ten (10) years.
- B. Contractor to provide a written, notarized, guarantee stating that the applied sealants shall show no failure due to improper installation for a period of five (5) years.
- C. Guarantee shall be in a form acceptable to the Owner and executed by an authorized individual.
- D. Include in guarantee provision, agreement to repair and/or replace, at Contractor's expense, sealant defects which develop during guarantee period, because of faulty labor and/or materials.

# PART 2 PRODUCTS

### 2.1 SEALANT MATERIALS

- A. Exterior Wall Sealant: Provide one (1) part non-sag sealant equal to No. 790 or 795 made by Dow Corning, "Silpruf SCS 2000" or "LM SCS 2700" made by G.E. or "Spectrem 1" or "Spectrem 3" made by Tremco or "Sonolastic 150" by Sonneborn conforming to the minimum standards of ASTM C 920, Type S, Grade NS, Class 50.
- B. Interior Sealant: Provide a one (1) part acrylic based sealant conforming to ASTM C 834, "AC-20+ Silicone" made by Pecora or made by Tremco or G.E.
- C. Colors: Colors selected from manufacturer's standard selection.

### 2.2 MISCELLANEOUS MATERIALS

- A. Back-Up Materials: Provide back-up materials and preformed joint fillers, non-staining, non-absorbent, compatible with sealant and primer, and of a resilient nature, equal to "HBR" made by Nomaco Inc. or Hohmann & Barnard or Emseal, twenty-five (25) percent wider than joint width. Materials impregnated with oil, bitumen or similar materials shall not be used. Provide back-up materials only as recommended by sealant manufacturer in writing.
- B. Provide bond breakers, where required, of polyethylene tape as recommended by manufacturer of sealant.
- C. Provide primers recommended by the sealant manufacturer for each material to receive sealant. Note that each exterior joint must be primed prior to sealing.
- D. Provide solvent, cleaning agents and other accessory materials as recommended by the sealant manufacturer.
- E. Materials shall be delivered to the job in sealed containers with manufacturer's original labels attached. Materials shall be used per manufacturer's printed instructions.

### PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where joint sealers are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION

A. Sealant Installation Standard: Comply with instructions and recommendations of the manufacturer and in accordance with ASTM C 1193 for use of joint sealants as applicable to materials, applications and conditions required by this Project where more stringent installation requirements are specified herein, such requirements shall apply.

### B. Sample Section of Sealant

 During sealant installation work in exterior wall, the manufacturer of sealant shall send his representative to the site, under whose supervision a section of the wall (used as "control section") shall be completed for purposes of determining performance characteristics of sealant in joints. Architect shall be informed of time and place of such installation of control section.

- Control section shall be installed according to specification given herein and shall not be considered as acceptable until written acceptance is provided by the Architect.
- 3. Accepted control section shall be standard to which all other sealant work must conform.
- C. Supervision: The Contractor shall submit to the Architect written certification from the sealant manufacturer that the applicators have been instructed in the proper application of their materials. The Contractor shall use only skilled and experienced workmen for installation of sealant.
- D. Apply sealant under pressure with a hand or power actuated gun or other appropriate means. Gun shall have nozzle of proper size and provide sufficient pressure to completely fill joints as detailed. Neatly point or tool joint to provide the contour as indicated on the drawings.
- E. Preparation and Application
  - 1. Thoroughly clean all joints, removing all foreign matter such as dust, oil, grease, water, surface dirt and frost. Sealant must be applied to the base surface. Previously applied film must be entirely removed.
  - 2. Stone, masonry and concrete surfaces to receive sealant shall be cleaned where necessary by grinding, water blast cleaning, mechanical abrading, or combination of these methods as required to provide a clean, sound base surface for sealant adhesion.
    - a. Do not use any acid or other material which might stain surfaces.
    - b. Remove laitance by grinding or mechanical abrading.
    - c. Remove loose particles present or resulting from grinding, abrading, or blast cleaning by blowing out joints with compressed air, oil and water free, or vacuuming joints prior to application of primer or sealant.
  - 3. Clean non-porous surfaces such as metal and glass chemically. Remove protective coatings on metallic surfaces by solvent that leaves no residue and is compatible with sealant. Use solvent and wipe dry with clean, dry lint free paper towels. Do not allow solvent to air dry without wiping. Clean joint areas protected with masking tape or strippable films as above after removal of tape film.
  - 4. Do not seal joints until they are in compliance with drawings, or meet with the control section standard.
  - 5. Joint Size and Sealant Size: Joints to receive sealant shall be at least 1/4" wide. In joint 1/4" to 3/8" wide, sealant shall be 1/4" deep. In joints wider than 3/8" and up to 1" wide, sealant depth shall be one half the joint width. For joints wider than

- 1", sealant depth shall be as recommended by the sealant manufacturer. Depth of joint is defined as distance from outside face of joint to closest point of the filler.
- 6. Primer: Thoroughly clean joints and apply primer to all surfaces that will receive sealant. Apply primer on clean, dry surfaces, and prior to installation of joint backing. Completely wet both inner faces of the joint with primer. Mask adjacent surfaces of joint with non-staining masking tape prior to priming. Apply primer with clean brush and only when temperature is above 45 deg. F.
- 7. Joint Backing: In joints where depth of joint exceeds required depth of sealant, install joint backing (after primer is dry) in joints to provide backing and proper joint shape for sealant. Proper shape for sealant is a very slight "hourglass" shape, with back and front face having slight concave curvature. Use special blunt T-shaped tool or roller to install joint backing to the proper and uniform depth required for the sealant. Joint backing shall be installed with approximately twenty-five (25) percent compressions. Do not stretch, twist, braid, puncture, or tear joint backing. Butt joint backing at intersections.
- 8. Bond Breaker: Install bond breaker smoothly over joint backing so that sealant adheres only to the sides of the joint and not backing.
- 9. Sealant Application: Apply sealant in accordance with the manufacturer's application manual and manufacturer's instructions, using hand guns or pressure equipment, on clean, dry, properly prepared substrates, completely filling joints to eliminate air pockets and voids. Mask adjacent surfaces of joint with non-staining masking tape. Force sealant into joint in front of the tip of the "caulking gun" (not pulled after it) and force sealant against sides to make uniform contact with sides of joint and to prevent entrapped air or pulling of sealant off of sides. Fill sealant space solid with sealant.
- 10. Tooling: Tool exposed joints to form smooth and uniform beds, with slightly concave surface conforming to joint configuration per Figure 4A in ASTM C 1193. Finished joints shall be straight, uniform, smooth and neatly finished. Remove masking tape immediately after tooling of sealant and before sealant face starts to "skin" over. Neatly remove any excess sealant from adjacent surfaces of joint, leaving the work in a neat, clean condition.
- 11. Replace sealant which is damaged during construction process.

**END OF SECTION** 



### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the expansion joint covers as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  - 1. Floor expansion joint cover assemblies.
  - 2. Ceiling expansion joint cover assemblies.

B. Fire rated expansion joint cover assemblies where required.

## 1.3 RELATED SECTIONS

Selective Demolition and Alteration Work - Section 024119.

#### 1.4 SUBMITTALS

- A. Submit product data for each type of expansion joint cover assembly specified, including manufacturer's product specifications, installation instructions, details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Submit shop drawings showing fabrication and installation of expansion joint cover assemblies, including plans, elevations, sections, details of components, joints, splices, and attachments to other units of work.
- C. Submit samples for verification purposes in full size units of each type of expansion joint cover assembly indicated; within sets for each finish, color, texture, and pattern specified, showing full range of variations expected in these characteristics. Install elastomeric material for joints, samples to verify color selected.

### 1.5 QUALITY ASSURANCE

- A. Fire Test Response Characteristics: Where indicated, provide expansion joint cover assemblies identical to those assemblies whose fire resistance has been determined per ANSI/UL 263, NFPA 251, U.B.C. 43-1, or ASTM E 119, including hose stream test of vertical wall assemblies, by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 1. Fire Resistance Ratings: 1 hour rating as shown on drawings.
- B. Joint covers shall permit unrestrained movement of joint without disengagement of cover.
- C. Floor joint cover plate assemblies shall be capable of supporting a 200 psf uniform load and a 300 lb. concentrated load with a deflection not to exceed 1/16".

# 1.6 DELIVERY, STORAGE AND HANDLING

- A. Provide temporary protective cover on finished surfaces.
- B. Deliver joint covers to jobsite in new, clean, unopened crates of sufficient size and strength to protect materials during transit.
- C. Store components in original containers in a clean, dry location.
- D. Handle components with equipment of sufficient size to preclude hazard to personnel or components.

### PART 2 PRODUCTS

### 2.1 MANUFACTURER

- A. Profiles and details shown on drawings are those of Construction Specialties unless otherwise noted; subject to compliance with requirements specified, other acceptable manufacturers include Balco/Metalines, Watson Bowman Acme, and MM Systems.
  - Interior Floor Cover at Exposed Locations: SJPFR Series, with UL listed fire barrier.
  - 2. Interior Floor Cover at Concealed Locations: RFB Series, with UL listed fire barrier.
  - 3. Interior Ceiling Cover at Drywall Construction: FWF Series with drywall taping flanges for concealed frame; color White.
  - 4. Interior floor cover at exposed and concealed locations for 1": GFT1X1, color TBD.
  - 5. Exterior Expansion Joints
    - a. Vertical Brick Walls, Student Center: SF Series for joints 2" and larger.
    - b. Horizontal Roof Joints: BRJ Sereis for joints 2"and larger.

### 2.2 MATERIALS

- A. Aluminum: ASTM B 221, alloy 6063-T5 for extrusions; ASTM B 209, alloy 6061-T6, sheet and plate; aluminum to have the following finishes:
  - 1. Interior and exterior walking surfaces shall have clear anodized (A41) finish.
  - Exterior surfaces not subject to pedestrian traffic shall have a "Kynar 500" finish conforming to NAAMM 605.2; two (2) colors shall be required, one (1) color to match metal siding and the other color to match adjacent concrete surfaces.
  - 3. Interior surfaces not subject to pedestrian traffic shall be shop primed with rust inhibitive primer, minimum 2 mils thick, ready to receive field painted finish.
- B. Stainless Steel: ASTM A 666, Type 304, No. 4 finish.
- Protect metal surfaces to be placed in contact with cementitious materials with a protective coating.
- D. Extruded Preformed Seals: Single or multi-cellular elastomeric profiles as classified under ASTM D 2000, designed with or without continuous, longitudinal, internal baffles. Formed to fit compatible frames, in color, as selected by Architect from manufacturer's standard colors.

- E. Fire Barriers: Designed for indicated or required dynamic structural movement without material degradation or fatigue when tested according to ASTM E 1399. Tested in maximum joint width condition with a field splice as a component of an expansion joint cover per ANSI/UL 263, NFPA 251, U.B.C. 43-1, or ASTM E 119, including hose stream test of vertical wall assemblies by a nationally recognized testing and inspecting agency acceptable to authorities having jurisdiction.
- F. Accessories: Manufacturer's standard anchors, fasteners, set screws, spacers, flexible moisture barrier and filler materials, drain tubes, lubricants, adhesive, and other accessories compatible with material in contact, as indicated or required for complete installations.

### 2.3 EXPANSION JOINT COVER ASSEMBLIES

- A. General: Provide expansion joint cover assemblies of design, basic profile, materials, and operation indicated on drawings. Provide units comparable to those indicated or required to accommodate joint size, variations in adjacent surfaces, and dynamic structural movement without material degradation or fatigue when tested according to ASTM E 1399. Furnish units in longest practical lengths to minimize number of end joints. Provide hairline mitered corners where joint changes direction or abuts other materials. Include closure materials and transition pieces, tee-joints, corners, transition pieces, curbs, cross-connections, and other accessories as required to provide continuous joint cover assemblies.
  - 1. Special conditions shall be shop fabricated.

2.

Fabric

ate components in largest practical lengths to minimize field splicing.

- B. Moisture Barrier: Provide manufacturer's continuous, standard, flexible vinyl moisture barrier under covers at locations indicated.
- C. Fire Rated Joint Covers: Provide expansion joint cover assemblies with manufacturer's continuous, standard, flexible fire barrier seals under covers at locations indicated to provide fire-resistive rating not less than the rating of adjacent construction.

## PART 3 EXECUTION

## 3.1 PREPARATION

A. Manufacturer's Instructions: In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for phases of Work, including preparing substrate, applying materials, and protecting installed units.

- B. Coordinate and furnish anchorages, setting drawings, templates, and instructions for installation of expansion joint cover assemblies to be embedded in or anchored to concrete or to have recesses formed into edges of concrete slab for later placement and grouting-in of frames.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary to secure expansion joint cover assemblies to in-place construction, including threaded fasteners with drilled-in expansion shields for masonry and concrete where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and provide for secure attachment of expansion joint cover assemblies.

## 3.2 INSTALLATION

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting into new and existing construction as required to install expansion joint covers. Install joint cover assemblies in true alignment and proper relationship to expansion joints and adjoining finished surfaces measured from established lines and levels. Allow adequate free movement of thermal expansion and contraction of metal to avoid buckling. Set floor covers at elevations to be flush. Locate wall, ceiling, roof, and soffit covers in continuous contact with adjacent surfaces. Securely attach in place with required accessories. Locate anchors at interval recommended by manufacturer, but not less than 3" from each end and not more than 24" o.c.
  - 1. Where cutting into existing construction, conform to the requirements of Section 024119.
- B. Continuity: Maintain continuity of expansion joint cover assemblies with a minimum number of end joints and align metal members mechanically using splice joints. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials (if any) to frames with adhesive or pressure sensitive tape as recommended by manufacturer.
- C. Extruded Preformed Seals: Install seals complying with manufacturer's instructions and with minimum number of end joints. For straight sections provide preformed seals in continual lengths. Vulcanize or heat-weld field splice joints in preformed seal material to provide watertight joints using procedures recommended by manufacturer. Apply adhesive, epoxy, or lubricant adhesive approved by manufacturer to both frame interfaces before installing preformed seal. Seal transitions according to manufacturer's instructions.
- D. Elastomeric Sealant Joint Assemblies: Seal end joints within continuous runs and joints at transitions according to manufacturer's directions to provide a watertight installation.
- E. Fire Barriers: Install fire barriers, including transitions and end joints, according to manufacturer's instructions so that fire-rated construction is continuous.

# 3.3 CLEANING AND PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's instructions.

**END OF SECTION** 

#### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work. Note that while proposed substitutions to specified products or other changes to the work introduced by the Contractor or the Sub-Contractors will be considered, any such substitution must meet or exceed all stated environmental (GREEN BUILDING) criteria.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the steel door and frame work as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - Interior and exterior hollow metal doors and frames for fire rated and unrated door openings.
  - 2. Interior hollow metal vision panels.
  - 3. Trimless door frames.
  - 4. Preparation of metal doors and frames to receive finish hardware, including reinforcements, drilling and tapping, as necessary.
  - 5. Preparation of hollow metal doors to receive glazing where required.
  - 6. Steel louvers for hollow metal doors.
  - 7. Furnishing anchors for building into masonry and drywall.
  - 8. Factory prime painting of work of this Section.

## 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Carpentry Section 062000, for installation of doors and frames.
- C. Wood Doors Section 081416.
- D. Finish Hardware Section 087100.
- E. Glass and Glazing Section 088000.
- F. Gypsum Drywall Section 092900.
- G. Painting and Finishing Section 099000.

## 1.4 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, compliance with standards referenced herein, sound and fire-resistance ratings, and finishes for each type of door and frame specified.
- B. Shop Drawings: Show fabrication and installation of doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, reinforcement for surface applied hardware, dimensions of profiles and

hardware preparation, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessories.

- C. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Drawings.
  - 1. Coordinate glazing frames and stops with glass and glazing requirements.
- D. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to comply with design, materials, and construction equivalent to requirements for labeled construction.

### 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A firm experienced in manufacturing custom steel doors and frames similar to those indicated for this Project and with a record of successful inservice performance, as well as sufficient production capacity to produce required units.
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. Source Limitations: Obtain custom steel doors and frames through one source from a single manufacturer.
- D. Fire-Rated Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated.
  - Test Pressure: Test according to NFPA 252 or UL 10C. After 5 minutes into the test, the neutral pressure level in furnace shall be established at 40" or less above the sill.
  - 2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors comply with standard construction requirements for tested and labeled fire-protection-rated door assemblies except for size.
  - 3. Temperature-Rise Rating: At exit enclosures, provide doors that have a temperature-rise rating as required by prevailing Building Code in 30 minutes of fire exposure.
- E. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities

- having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257 or UL 9. Label each individual glazed lite.
- F. Smoke-Control Door Assemblies: Comply with NFPA 105 or UL 1784.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver doors and frames palleted, wrapped, or crated to provide protection during transit and Project site storage. Do not use nonvented plastic.
- B. Inspect doors and frames, on delivery, for damage. Minor damage may be repaired provided refinished items match new work and are approved by Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames under cover at building site. Conform to the requirements of ANSI A 250-11-2001 for site storage unless more stringent requirements are noted herein. Place units on minimum 4-inch high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to permit air circulation.

#### PART 2 PRODUCTS

## 2.1 FABRICATION - GENERAL

- A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- B. Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- C. Prepare hollow metal units to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."
- Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.

#### 2.2 MANUFACTURERS

A. Provide products manufactured by Steelcraft, Curries, Ceco Door Products, meeting these specifications.

### 2.3 FRAMES

## A. Materials

- Frames for exterior openings shall be made of commercial grade cold-rolled steel conforming to ASTM A 1008, Type B not less than 14 ga., and shall have a hot dipped galvannealed coating conforming to ASTM A 924 and A 653 with A60 coating. The zinc-alloy coating shall be a dull matte surface treated for paint adhesion.
- 2. Frames for interior openings shall be either commercial grade cold-rolled steel conforming to ASTM A 1008, Type B or commercial grade hot-rolled steel conforming to ASTM A 1011, Commercial Steel, Type B. Metal thickness shall be not less than sixteen (16) ga. for frames in openings 4'-0" or less in width; not less than fourteen (14) ga. for frames in openings over 4'-0" in width.
- Frames for trimless openings shall be 18 gauge galvannealed steel adjustable trimless door frame by Fry Reglet and invisible type door hinges by manufacturer, or by "EZY Jamb,". Profiles and details shown on the drawings are those of Fry Reglet Trimless Frame unless otherwise noted; subject to compliance with requirements specified, other acceptable manufacturers are EZY Jamb and Luadi Door L16.

## B. Design and Construction

- All frames shall be welded units with integral trim, of the sizes and shapes shown on approved shop drawings. Unless otherwise noted, knock-down frames will not be accepted.
- 2. All finished work shall be strong and rigid, neat in appearance, square, true and free of defects, warp or buckle. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.
- 3. Jamb depths, trim, profile and backbends shall be as shown on drawings.
  - a. Frames at drywall partitions shall be formed with double return backbends to prevent cutting into drywall surface.
- 4. Welded frames shall have corners mitered and reinforced and faces of welded frames shall be continuously back welded full depth and width of frame conforming to NAAMM Standard HMMA-820; face joints shall be inconspicuous.
- 5. Minimum depth of stops shall be 5/8".
- 6. Frames for multiple or special openings shall have mullion and/or rail members which are closed tubular shapes having no visible seams or joints. All joints

between faces of abutting members shall be securely welded and finished smooth.

a. Mullions shall have 16 ga. internal steel stiffeners welded not less than 4" o.c.

## 7. Hardware Reinforcements

- a. Frames shall be mortised, reinforced, drilled and tapped at the factory for fully-templated mortised hardware only, in accordance with approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have reinforcing plates.
- b. Minimum thickness of hardware reinforcing plates shall be as follows:
  - 1). Hinge and pivot reinforcements seven (7) ga., 1-1/4" x 10" minimum size.
  - 2). Strike reinforcements twelve (12) gauge
  - 3). Flush bolt reinforcements twelve (12) gauge
  - 4). Closer reinforcements twelve (12) gauge
  - 5). Reinforcements for surface mounted hardware twelve (12) gauge.
  - 6). Reinforcement for recessed vertical rod exit devices seven (7) gauge.

### 8. Floor Anchors

- a. Provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
- b. Minimum thickness of floor anchors shall be fourteen (14) gauge.

### 9. Jamb Anchors

- a. Frames for installation in masonry walls shall be provided with adjustable jamb anchors of the wire type. Anchors shall be not less than 0.156" diameter steel wire. The number of anchors provided on each jamb shall be as follows:
  - 1). Frames up to 7'-6" height three (3) anchors.
  - 2). Frames 7'-6" to 8'-0" height four (4) anchors.
  - 3). Frames over 8'-0" height one (1) anchor for each 2'-0" or fraction thereof in height.
- b. Frames for installation in stud partitions shall be provided with steel anchors of suitable design, not less than eighteen (18) gauge thickness, securely welded inside each jamb as follows:
  - 1). Frames up to 7'-6" height four (4) anchors.
  - 2). Frames 7'-6" to 8'-0" height five (5) anchors.
  - 3). Frames over 8'-0" height five (5) anchors plus one additional for each 2'-0" or fraction thereof over 8'-0".

- c. Frames to be anchored to previously placed concrete or masonry shall be provided with minimum 3/8" concealed bolts set into expansion shields or inserts at six (6) inches from top and bottom and twenty-four (24) inches o.c. Reinforce frames at anchor locations with sixteen (16) gauge sheet steel stiffeners welded to frame at each anchor.
- Anchors in exterior frames and in masonry walls shall be hot dip galvanized per ASTM A 153.
- 11. Frames for installation in masonry wall openings more than 4'-0" in width shall have an angle or channel stiffener factory welded into the head. Such stiffeners shall be not less than twelve (12) gauge steel and not longer than the opening width, and shall not be used as lintels or load bearing members.
- 12. Dust cover boxes (or mortar guards) of not thinner than twenty-six (26) gauge steel shall be provided at all hardware mortises on frames to be set in masonry or plaster partitions.
- 13. Ceiling Struts: Minimum 3/8" thick x 2" wide steel.
- 14. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.
- 15. Loose glazing stops shall be of cold rolled steel, not less than twenty (20) gauge thickness, butted at corner joints and secured to the frame with countersunk cadmium-or zinc-plated screws. Interior frames may be provided with snap-on glazing stops.
- 16. Except on weatherstripped frames, drill stops to receive three (3) silencers on strike jambs of single door frames and two (2) silencers on heads of double-door frames.
- C. Finish: After fabrication, all tool marks and surface imperfections shall be removed, and exposed faces of all welded joints shall be dressed smooth. Frames shall then be chemically treated to insure maximum paint adhesion and shall be coated on all surfaces with one coat of rust-inhibitive baked-on alkyd primer standard with the manufacturer which is fully cured before shipment to a dry film thickness of 2.0 mils.
  - 1. Frames set in masonry walls shall be grouted in as described in Section 042000, "Unit Masonry." These frames shall have surfaces in contact with grout shop coated with epoxy coating Series 27 FC Typoxy (basis of design) made by Tnemec, "Carboguard 893 SG" or "Carboguard 888" by Carboline; 160 Series by Corotech/Moore or "Macropoxy 646 I.C. Epoxy B58-600" by Sherwin Williams spray applied at 4 to 6 mils, passing NFPA 101, Class A for smoke and flame spread, tested per ASTM E 84.

### 2.4 HOLLOW METAL DOORS

A. Materials: Doors shall be made of commercial quality, level, cold rolled steel conforming to ASTM A 1008, Commercial Steel, Type B and free of scale, pitting or other surface defects. Face sheets for interior doors shall be not less than eighteen (18) gauge. Face sheets for exterior doors shall be not less than sixteen (16) gauge and shall have a hot dipped galvannealed coating conforming to ASTM A 924 and A 653, A60 coating. The zinc alloy coating shall be a dull matte surface treated for paint adhesion.

## B. Design and Construction

- 1. All doors shall be of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4".
- 2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckles. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.
- 3. Face sheets shall be stiffened by continuous vertical formed steel sections spanning the full thickness of the interior space between door faces. These stiffeners shall be not less than twenty two (22) gauge spaced not more than six (6) inches apart and securely attached to face sheets by spot welds not more than five (5) inches o.c. Spaces between stiffeners shall be sound deadened and thermal insulated the full height of the door with an inorganic non-combustible batt type material.
- 4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
- 5. Top and bottom edges of all doors shall be closed with a continuous recessed steel channel not less than fourteen (14) gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and, where required for attachment of weatherstripping, a flush closure also at their bottom edges. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.
- 6. Edge profiles shall be provided on both vertical edges of doors as follows:
  - a. Single-Acting Swing Doors: Beveled 1/8" in two (2) inches.
  - b. Double-Acting Swing Doors: Rounded on 2-1/8" radius.
  - c. No square edge doors permitted.
- 7. Hardware Reinforcements

- a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accord with the approved hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware (or hardware, the interrelation of which is to be adjusted upon installation such as top and bottom pivots, floor closers, etc.) is to be applied, doors shall have reinforcing plates.
- b. Minimum gauges for hardware reinforcing plates shall be as follows:
  - 1). Hinge and pivot reinforcement seven (7) gauge.
  - 2). Reinforcement for lock face, flush bolts, concealed holders, concealed or surface mounted closers twelve (12) gauge.
  - 3). Reinforcements for all other surface mounted hardware sixteen (16) gauge.
  - 4). Reinforcement for recessed vertical rod exit devices seven (7) gauge.

## 8. Glass Moldings and Stops

- a. Where specified or scheduled, doors shall be provided with hollow metal moldings to secure glazing by others in accordance with glass opening sizes shown on drawings.
- b. Fixed moldings shall be securely welded to the door on the security side.
- c. Loose stops shall be not less than twenty (20) gauge steel, with mitered corner joints, secured to the framed opening by cadmium or zinc-coated countersunk screws spaced eight (8) inches o.c. Snap-on attachments will not be permitted. Stops shall be flush with face of door.
- 9. Louvers shall be sixteen (16) gauge sheet steel, stationary type, closely spaced inverted "V" blade design, flush with face sheets of door, integral with and welded to door. Fifty (50) percent free area, unless indicated otherwise on drawings.
- C. Finish: After fabrication, all tool marks and surface imperfections shall be dressed, filled and sanded as required to make all faces and vertical edges smooth, level and free of all irregularities. Doors shall then be chemically treated to insure maximum paint adhesion and shall be coated, on all exposed surfaces, with manufacturer's standard rust-inhibitive alkyd primer as specified for frames which shall be fully cured before shipment.
- D. Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in any direction, including in a diagonal direction.

## 2.5 LABELED DOORS AND FRAMES

A. Labeled doors and frames shall be provided for those openings requiring fire protection ratings as scheduled on drawings. Such doors and frames shall be labeled by Underwriters' Laboratories or other nationally recognized agency having a factory inspection service. B. If any door or frame specified by the Architect to be fire-rated cannot qualify for appropriate labeling because of its design, size, hardware or any other reason, the Architect shall be so advised before fabricating work on that item is started.

#### 2.6 HARDWARF LOCATIONS

A. The location of hardware on doors and frames shall be as noted in "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames" of the Door Hardware Institute unless otherwise required by prevailing Handicapped Codes.

# 2.7 CLEARANCES

- A. Fabricate doors and frames to meet edge clearances as follows:
  - 1. Jambs and Head: 1/8" plus or minus 1/16".
  - 2. Meeting Edges, Pairs of Doors: 1/8" plus or minus 1/16".
  - 3. Bottom: 1/4" if no threshold; see drawings for requirement at thresholds.
- B. Fire rated doors shall have clearances as required by NFPA 80.

## 2.8 MANUFACTURING TOLERANCES

A. Manufacturing tolerance shall be maintained within the limits given in HMMA 841 of ANSI/NAAMM, current edition.

## 2.9 PREPARATION FOR FINISH HARDWARE

- A. Prepare door and frames to receive hardware:
  - 1. Hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.
  - 2. Preparation includes sinkages and cut-outs for mortise and concealed hardware.
- B. Provide reinforcements for both concealed and surface applied hardware:
  - 1. Drill and tap mortise reinforcements at factory, using templates.
  - 2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

## 2.10 REJECTION

A. Hollow metal frames or doors which are defective, have hardware cutouts of improper size or location, or which prevent proper installation of doors, hardware or work of other trades, shall be removed and replaced with new at no cost.

## PART 3 EXECUTION

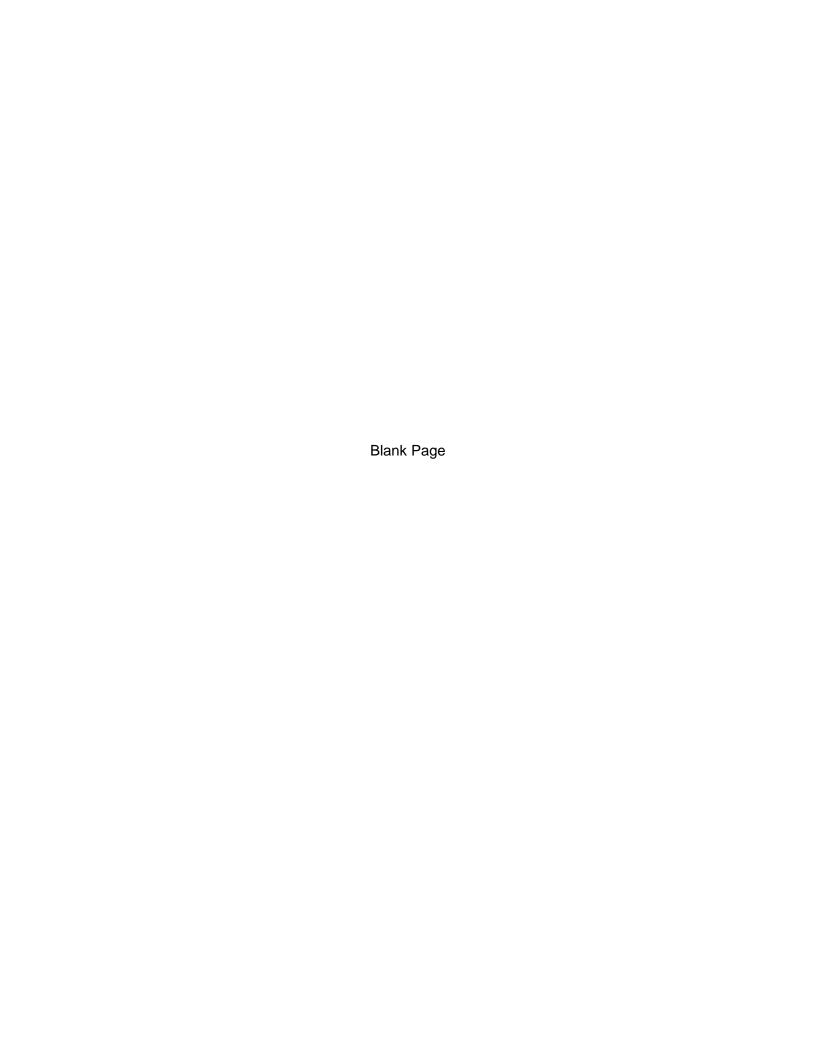
## 3.1 INSPECTION

A. Examine the areas and conditions where steel doors and frames are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION

A. Refer to Section 062000 for installation procedures for all work of this Section.

**END OF SECTION** 



### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work. Note that while proposed substitutions to specified products or other changes to the work introduced by the Contractor or the Sub-Contractors will be considered, any such substitution must meet or exceed all stated environmental (GREEN BUILDING) criteria.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the stainless steel door and frame work as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Stainless steel doors and frames.
  - 2. Preparation of doors and frames to receive finish hardware.

- 3. Furnishing anchors.
- 4. Installation of doors and frames.

#### 1.3 RELATED SECTIONS

- A. Steel Doors and Frames Section 081113.
- B. Finish Hardware Section 087100.
- C. Glass and Glazing Section 088000.

#### 1.4 QUALITY ASSURANCE

- A. Codes and Standards: In addition to complying with all pertinent codes and regulations:
  - Shop drawings, shall comply with nomenclature established in American National Standards Institute publication A123.1, latest edition, "Nomenclature for Steel Doors and Steel Door Frames."
    - ANSI A115 "Door and Frame Preparation for Door Locks and Flush Bolts," American National Standards Institute.
    - b. ANSI A123.1 "Nomenclature for Steel Doors and Steel Door Frames," American National Standards Institute.
    - c. Steel doors and frames shall comply with the Specifications for Custom Hollow Metal Doors and Frames, National Association of Architectural Metal Manufacturers (NAAMM) Standard CHM 174.
    - d. Builders' Hardware Manufacturers Association.
- B. All stainless steel shall conform to ASTM A 666, Type 316.
- C. Custom stainless steel fabrications shall be made by a single manufacturer who has a dedicated facility for the assembly, welding, and polishing of stainless steel. The manufacturer shall have dedicated tooling, fixtures, and machine tools used exclusively for the manufacture of stainless steel products, and which shall not be used for other metals, especially carbon steel.

#### 1.5 SUBMITTALS

- A. Shop Drawings
  - 1. Shop drawings shall indicate at large scale, profiles, gauges, sizes and reinforcing and anchorage devices, for securing to adjacent construction.
    - Indicate glazing frames and stops for coordination with "Glass and Glazing" section.
  - Shop drawings shall include schedules, listing the qualities of each kind and type of buck, frame, trim and door, size of doors and frames, clearances, undercuts, location and label requirements.

 Schedule of doors and frames shall use same reference numbers for details and openings as those on the Contract Documents.

### 1.6 PRODUCT HANDLING

A. Deliver doors and frames and other work of this Section properly tagged and identified.

#### B. Protection

- Deliver, store and handle all metal doors and frames in a manner to prevent damage and deterioration.
- 2. Provide packaging, separators, banding, spreaders, and individual wrappings as required to completely protect all metal doors and frames during transportation and storage.
- 3. Store doors upright, in a protected dry area, at least one (1) inch off the ground and with at least 1/4" air space between individual pieces; protect all surfaces as required.

### PART 2 PRODUCTS

### 2.1 FABRICATION - GENERAL

- A. Stainless steel doors and frames shall be rigid, neat in appearance and free from defects, warp, or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously, grind, dress, and make smooth, flush, and invisible.
- B. Unless otherwise indicated, provide countersunk flat stainless steel Phillips or Jackson heads for exposed screws and bolts.
- C. Prepare stainless steel doors and frames to receive finish hardware, including cutouts, reinforcing, drilling and tapping in accordance with final Finish Hardware Schedule and templates provided by hardware suppliers. Comply with applicable requirements of ANSI A115 "Specifications for Door and Frame Preparation for Hardware."
- Locate finish hardware as shown on final shop drawings in accordance with locations noted herein.

### 2.2 MANUFACTURERS

A. Provide products manufactured by Next Door Company (basis of design), subject to compliance with the requirements specified, other acceptable manufacturers are Stainless Steel Door Inc., and Neoporte Modern Door

## 2.3 STAINLESS STEEL FRAMES

A. Materials: Frames shall be stainless steel conforming to ASTM A 666, Type 316. Metal thickness shall be not less than sixteen (16) gauge for openings 4'-0" or less in width; not less than fourteen (14) gauge for frames in openings over 4'-0" in width.

## B. Design and Construction

- 1. All frames shall be custom made welded units with integral trim, of the sizes and shapes shown on approved shop drawings.
- 2. Molded members shall be clean cut, straight and of uniform profile throughout their lengths.
- 3. Jamb depths, trim, profile and backbends shall be as shown on drawings.
- 4. Corner joints shall have all contact edges closed tight, with trim faces mitered and continuously welded, and stops mitered. The use of gussets will not be permitted.
- 5. Minimum depth of stops shall be 5/8" with acoustic seals and gaskets.
- 6. Hardware Reinforcements: Frames shall be mortised, reinforced, drilled and tapped at the factory for fully templated mortised hardware only, in accord with approved finish hardware schedule and templates provided by the hardware supplier. Where surface-mounted hardware is to be applied, frames shall have stainless steel reinforcing plates as follows:
  - a. Hinges: Seven (7) gauge, 1-1/4" x 10" minimum size.
  - b. Strikes: Twelve (12) gauge.
  - c. Closers: Twelve (12) gauge.
  - d. Surface Mounted Hardware: Twelve (12) gauge.

## 7. Floor Anchors

- a. Floor anchors shall be securely welded inside each jamb for floor anchorage.
- b. Where required, provide adjustable floor anchors, providing not less than two (2) inch height adjustment.
- c. Minimum thickness of floor anchors shall be fourteen (14) gauge stainless steel.

#### 8. Jamb Anchors

- a. Frames for installation in masonry walls shall have three (3) anchors adjustable jamb anchors of the T-strap or stirrup and strap type. Anchors shall be not less than sixteen (16) gauge stainless steel or 0.156" diameter stainless steel wire. Stirrup straps shall be not less than 2" x 10" in size, corrugated and/or perforated stainless
- b. Frames for installation in stud partitions shall have four (4) stainless steel anchors of suitable design, not less than eighteen (18) gauge thickness, securely welded inside each jamb.
- 9. Dust cover boxes (or mortar guards) of not thinner than twenty-six (26) gauge stainless steel shall be provided at all hardware mortises on frames to be set in masonry partitions.
- 10. All frames shall be provided with a steel spreader temporarily attached to the feet of both jambs to serve as a brace during shipping and handling.

- 11. Removable glazing stops shall be of stainless steel, not less than twenty (20) gauge thickness, butted at corner joints and secured to the frame with countersunk stainless steel screws.
- 12. Frames shall be packed with unfaced acoustic insulation equal to "Acoustic Thermafiber," 3 lb. density, made by U.S. Gypsum Co. or approved equal.
- C. Finish: No. 6 finish; long grain vertical pattern.

## 2.4 STAINLESS STEEL DOORS

- A. Materials: Doors shall be made of commercial quality, level, rolled stainless steel conforming to ASTM A 666, Type 316, and free of scale, pitting or other surface defects. Face sheets for doors shall be not less than eighteen (18) gauge.
- B. Design and Construction
  - 1. All doors shall be custom made, of the types and sizes shown on the approved shop drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Minimum door thickness shall be 1-3/4".
  - 2. All doors shall be strong, rigid and neat in appearance, free from warpage or buckles.

    Corner bends shall be true and straight and of minimum radius for the gauge of metal used.
  - 3. Face sheets shall be stiffened by continuous vertical formed stainless steel sections spanning the full thickness of the interior space between door faces. These stiffeners shall be not less than twenty-two (22) gauge spaced not more than six (6) inches apart and securely attached to face sheets by spot welds not more than five (5) inches o.c. Spaces between stiffeners shall be sound-deadened the full height of the door with an inorganic non-combustible batt type acoustic insulation material.
  - 4. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
  - 5. Top and bottom edges of all doors shall be closed with a continuous recessed stainless steel channel not less than sixteen (16) gauge, extending the full width of the door and spot welded to both faces. Exterior doors shall have an additional flush closing channel at their top edges and a flush closure at bottom for attachment of weatherstripping. Openings shall be provided in the bottom closure of exterior doors to permit the escape of entrapped moisture.
  - 6. Edge profiles shall be beveled 1/8" in two (2) inches.
  - 7. Hardware Reinforcements
    - a. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully templated hardware only in accordance with the approved finish hardware schedule and templates provided by the hardware supplier.

- b. Steel doors shall have the following minimum gauge reinforcing plates:
  - 1). Hinges: Seven (7) gauge.
  - 2). Lock Faces and Closers: Twelve (12) gauge.
  - 3). Surface Mounted Hardware: Sixteen (16) gauge, unless otherwise indicated.
- C. Finish: As specified for frames.
- D. Flatness: Doors shall maintain a flatness tolerance of 1/16" maximum, in every direction.
- E. Factory-Glazed Fabrication: Glaze doors in the factory where practical and possible for applications indicated. Provide circular vision lites with stainless steel stops, flush mounted with face of door, using 1/2" thick clear, low-iron tempered glass complying with requirements in Section 088000, "Glass and Glazing."

#### 2.5 HARDWARE LOCATIONS

A. The location of finish hardware items, specified in "Finish Hardware" section shall be as indicated in "Recommended Locations for Builders Hardware" as published by the Door and Hardware Institute, unless otherwise indicated.

## 2.6 CLEARANCES

- A. Edge clearances shall be provided as follows, unless otherwise indicated:
  - 1. Heads and Jambs: 1/8".
  - 2. Door Sills (where no threshold is used): 1/4" maximum above finished floor.
  - 3. Door Sills (where threshold is used): Per architectural drawings for each type of threshold.
- B. Finished floor is defined as the top surface of the floor.

#### 2.7 PREPARATION FOR FINISH HARDWARE

- A. Finish hardware supplier shall furnish hollow metal manufacturer approved hardware schedule, hardware templates, and samples of physical hardware where necessary to insure correct fitting and installation.
- B. Preparation includes sinkages and cut-outs for mortise and concealed hardware.
- C. Provide reinforcements for both concealed and surface applied hardware.
  - 1. Drill and tap mortise reinforcements at factory, using templates.
  - 2. Install reinforcements with concealed connections designed to develop full strength of reinforcements.

### PART 3 EXECUTION

### 3.1 FRAME INSTALLATION

- A. Comply with provisions of SDI-105 "Recommended Erection Instructions For Steel Frames."
- B. Where possible, place frames prior to construction of enclosing walls and ceilings. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces and spreaders leaving surfaces smooth and undamaged.
- C. In stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In closed steel stud partitions, attach wall anchors to studs with tapping screws.

### 3.2 DOOR INSTALLATION

- A. Fit hollow metal doors accurately in frames, within clearances specified herein.
- B. Inspect work after installation and repair damaged items equal to new work, or remove and replace damaged items.

**END OF SECTION** 



### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the wood doors as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Solid core flush wood doors.
  - 2. Fire rated flush wood doors.

## 1.3 RELATED SECTIONS

- A. Carpentry Section 062000, for installation of wood doors.
- B. Steel Doors and Frames Section 081113, for hollow metal frames.
- C. Finish Hardware Section 087100.
- D. Glass and Glazing Section 088000.
- E. Painting and Finishing Section 099000, for field painting of wood doors.

#### 1.4 SUBMITTALS

- A. Product Data: Submit door manufacturer's product data, specifications and installation instructions for each type of wood door.
  - 1. Include details of core and edge construction and trim for openings.
  - 2. Include factory finish specifications.
  - 3. Include certifications to show compliance with specifications.
  - 4. Include certification to show compliance with AWI and WDMA requirements specified herein.
- B. Shop Drawings: Submit shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for finishing and other pertinent data.
  - 1. Include requirements for veneer matching.
- C. Submit samples of factory finishes applied to actual door face materials, approximately 8 by 10 inches for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

### 1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.
- B. Quality Standard: Comply with AWI's "Architectural Woodwork Quality Standards Illustrated"; latest edition "Premium" grade and WDMA "Extra Heavy Duty" Performance Level.
  - 1. Only manufacturers that are certified and listed by AWI to be QCP qualified are acceptable for this project.

- 2. Provide letter of licensing for Project indicating that doors comply with requirements of grade specified.
- C. Fire Rated Wood Doors: Doors complying with Category A, Positive Pressure or Neutral Pressure testing standards per UBC 7-2-1997 and UL 10-C (UBC 7-2-1994 and UL 10B) that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated on Door Schedule, based on testing according to NFPA 252.
  - 1. Conform to prevailing Code requirements to determine which pressure standard (Positive or Neutral) is required.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

### 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) in excess of permitted standard noted in Article 2.2 herein, or show telegraphing of core construction in face veneers.
  - 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
  - 2. Warranty shall be in effect for the life of the installation starting from date of Substantial Completion.

## PART 2 PRODUCTS

# 2.1 SOLID CORE FLUSH WOOD DOORS

A. Provide AWI PC-5 Premium Grade hot pressed 5-ply solid core particleboard doors, 1-3/4" thick, conforming to standards specified herein. Subject to meeting standards specified herein, the following manufacturers are acceptable: Marshfield Door Systems, Inc., Algoma Hardwoods Inc., or Eggers Industries.

- Core shall consist of a formed flat panel consisting of wood particles bonded together with synthetic resins or other added binder, with an average density of 30 to 32 lbs. per cubic foot. The material shall meet or exceed the requirements of ANSI A208.1, Grade 1-LD-2 covering mat formed particleboard with face screw holding of 124 lbs., modulus of rupture of minimum 700 psi and modulus of elasticity of not less than 148,000 psi.
- 2. Core shall be capable of satisfying this WDMA TM-7 cycle slam test for 1 million slams for surface mounted hardware. Where the manufacturer's core does not meet this criterion, stiles and rails must measure a minimum of 5-1/2" and must be fabricated of hardwood.
  - a. Surface mounted hardware must be installed with minimum 1-1/4" screw penetrations using threaded to the head screws; coordinate with Section 087100.
- B. Cross Bands: Shall be 1/16" thick hardwood extending full width of door and laid with grain at right angles to face veneers. Cross bands and faces shall be laminated to the core with Type I MF or PVA glue.
- C. Stiles, Rails: Stile and rail shall be a minimum of 1-3/8" solid hardwood or structural composite lumber (after trimming) laminated to the core. Stiles and rails must be securely glued to the core with no voids allowed. Stiles and rails must be capable of screw holding of 550 lbs. per WDMA TM-10.
- D. Transparent Finish: Finish in the shop with clear satin catalyzed polyurethane finish conforming to AWI System "Catalyzed Polyurethane Transparent."
  - 1. Doors with transparent finish to have center balanced, slip matched, rift sawn, Select, clear white oak face veneer. Veneer to conform to AWI, "AA" grade veneer with 3" wide leaf. Minimum veneer thickness shall be not less than 1/50" after sanding.
  - 2. Veneers shall be continuous or end matched at transoms.
- E. Opaque Finish: For doors to be field painted, shop prime on all surfaces with one coat of alkyd wood primer applied to a dry film thickness of 1.5 mils.
  - 1. Doors to be field painted shall have MDO or hardboard face.
- F. Where glass lites are noted, factory cut openings. Trim openings with solid hardwood moldings of same type of wood as face veneer. Lite openings in 20 minute rated doors shall have manufacturer's 20 minute approved hardwood system.
- G. Doors shall have hinge-loading capacity of 500 lbs. per WDMA TM-8.
- H. Vertical door edge must be capable of screw holding of 550 lbs. per WDMA TM-10; horizontal door edge must be capable of screw holding of 400 lbs. per WDMA TM-10.

- I. Fire-Rated Wood Doors: Provide mineral core 1-3/4" thick solid core wood doors conforming to standards specified herein, manufactured by one of the manufacturers noted above. Stile construction on both stiles shall conform to the following:
  - 1. Stile edge screw withdrawals when tested in accordance with ASTM D 1037-78 shall exceed 650 lbs. This applies to both stiles.
  - Stile edge split resistance when tested in accordance with ASTM D 143-52 (78)
     Modified must exceed 950 lbs. This applies to both stiles.
  - 3. Door to have face finish as specified above.
    - a. Where the core is free of urea formaldehyde, provide a layer of veneer over the substrate prior to application of finish veneer to prevent telegraphing of patterns from the adhesive.
  - 4. Blocking: For surface mounted hardware only, provide composite blocking designed to maintain fire resistance of door but with improved screw-holding capability of same thickness as core and with minimum dimensions as follows:
    - a. 5-inch top rail blocking.
    - b. 5-inch bottom rail blocking.
    - c. 1 5" x 18" lock block at cylinder or mortise locksets.
    - d. 2-5" x 18" lock blocks at exit devices.
  - 5. Pairs: Provide fire-rated pairs with fire-retardant stiles that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

### 2.2 FABRICATION

- A. Prefit and premachine wood doors at the factory.
- B. Comply with the tolerance requirements specified herein. Machine doors for hardware requiring cutting of doors. Comply with final hardware scheduled and door frame shop drawings, and with hardware templates and other essential information required to ensure proper fit of doors and hardware.
- C. Take accurate field measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with machining in the factory.
- D. Doors shall be factory sized to door opening so that trimming and fitting are not required in the field.
- E. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances unless otherwise indicated.
  - Three degree bevel or bevel to suit frame sizes indicated, with 3/16" prefit in width, +0/-1/32" tolerances. Prefit top of door 1/8" + 1/16"/-0" and undercut as required by floor condition. Undercut shall not exceed 1/8" from bottom of door to top of

finished floor; where threshold occurs undercut shall not exceed 1/8" from bottom of door to top of threshold.

- 2. Comply with requirements in NFPA 80 for fire-rated doors.
- F. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3 unless otherwise noted. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.
  - 1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
  - 2. Provide concealed intumescent seals at fire-rated pairs of doors meeting the requirements of U.L. 10 C.
- G. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kinds of doors required.
- H. Once doors are installed, maximum allowable warp, bow, cut or twist in doors shall be 1/16" as measured by the 1/16 inch feeler gauge and a straight-edge extending from corner to corner of the door face at stiles, top and bottom rails and along both diagonals.

## PART 3 EXECUTION

### 3.1 INSTALLATION

A. Refer to Section 062000 for installation of wood doors.

**END OF SECTION** 

#### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work. Note that while proposed substitutions to specified products or other changes to the work introduced by the Contractor or the Sub-Contractors will be considered, any such substitution must meet or exceed all stated environmental (GREEN BUILDING) criteria.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the access doors as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Frameless recessed panel access doors at drywall ceilings and walls.
  - 2. Framed flush panel access doors at masonry and tile walls.
  - 3. GFRG access panels at drywall ceilings.
  - Provide access doors and frames for access from occupied spaces to the following, where indicated or required, and as directed by the trades of Divisions 23 and 26.
    - All shutoff or balancing valves.
    - b. Fire dampers, as required.
    - c. Points of duct access.
    - d. Pull boxes.
    - e. Controls of mechanical and electrical items.
    - f. Masonry shafts for pipes and conduits, as required.
    - g. Pipe spaces, if required.
    - h. Inlets of fans.
    - i. Fusible link and splitter damper at filter bank.
    - j. Automatic damper and motor.
    - k. Equipment not otherwise accessible.

## 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Gypsum Drywall Section 092900.
- C. Ceramic Tiling Section 093013.
- D. Valves and connections Division 23.

## 1.4 QUALITY ASSURANCE

- A. For actual installation of the work of this Section, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the skills required.
- B. Fire-Resistance Ratings: Wherever a fire-resistance classification is shown, or for construction where access doors are installed, provide required access door assembly with panel door, frame, hinge and latch from manufacturers listed in Underwriters' Laboratories, Inc. "Classified Building Materials Index" for the rating shown.

- 1. Provide UL label on each access panel.
- 2. Provide flush, key operated cylinder lock.
- C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes shown or scheduled.

## 1.5 SUBMITTALS

A. Before any materials of this Section are delivered to the job site, submit complete manufacturer's literature to the Architect. Submit plans and schedules showing size and location of each and every access door for Architect's acceptance prior to installation.

### 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

## PART 2 PRODUCTS

#### 2.1 GFRG ACCESS PANELS

- A. For use in drywall ceilings, provide access panels made from glass fiber reinforced gypsum (GFRG) as manufactured by Castle Access Panels and Forms Inc., Wind-Lock, Formglas, IntexForms.
  - Provide access panels architecturally designed to blend seamlessly with drywall ceiling and wall construction. Coordinate work with Section 092900, "Gypsum Drywall."
  - 2. Panels shall be Class A rated, with a flame spread and smoke developed index of 0 in accordance with ASTM E 84.

### 2.2 METAL ACCESS PANELS

- A. Provide access door assembly manufactured by Milcor Inc, or made by Nystrom Inc., Karp Associates, Inc.. Assembly shall be an integral unit complete with all parts and ready for installation.
- B. Fabricate units of continuous welded steel construction. Grind welds smooth and flush with adjacent surfaces. Provide attachment devices and fasteners of the type required to secure access panels to the types of supports shown.

- C. Frames for Masonry and Tile Wall Only (Flush Panel Units): Fabricate frame from sixteen (16) gauge steel. Provide frame with exposed flange not less than one (1) inch wide around perimeter of frame for exposed masonry and tile finishes.
  - 1. For installation in masonry construction, provide frames with adjustable metal masonry anchors.
- D. Frameless Units for Drywall Surfaces (Recessed Panel Units): Provide access doors without exposed frames for drywall adhered to recessed panel.
- E. Panels: Fabricate from fourteen (14) gauge steel, with concealed spring hinges set to open to 175 degrees. Provide removable pin type hinges of the quantity required to support the access panel sizes used in the work. Finish with manufacturer's factory applied baked enamel prime coat applied over phosphate protective coating on steel.

#### 2.3 ACCESSORIES

## A. Locking Devices

- 1. For non-rated access doors, provide flush, screwdriver operated cam locks of number required to hold door in flush, smooth plane when closed.
- 2. For fire rated doors, provide locks as described in paragraph 1.4, B. herein.
- B. Inserts and Anchorage: Furnish inserts and anchoring devices which must be built into masonry for the installation of access panels. Provide setting drawings, templates, instructions, and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

## PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where access doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 COORDINATION

- A. Coordinate all work with the mechanical trades to insure proper locations and in a timely manner to permit orderly progress of the total work.
- B. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.
- C. Adjust hardware and panels after installation for proper operation.

D. Remove and replace panels or frames which are warped, bowed, or otherwise damaged.

**END OF SECTION** 



#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the coiling counter doors as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Coiling steel counter doors, fire-rated.

- 2. Motor operation.
- 3. Guides, anchors and hardware required for complete installation and operation.

### 1.1 RELATED SECTIONS

- A. Painting and Finishing Section 099000.
- B. Electrical Division 26.

## 1.2 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
  - 1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100.
- C. Fire Rated Assemblies: Furnish fire rated assemblies in 1-hour rated wall at box office opening which comply with NFPA No. 80 and have been fire tested, rated and labeled in accordance with ANSI/ASTM E 152. Furnish each door with a metal UL label as evidence of rating, with label indicating rating in hours of duration of exposure to fire and letter designation of location for which assembly is designed.
- D. Automatic Closing: Provide automatic closing device and governor, operating when activated by temperature rise and melting of 160 deg. F. (71 deg. C.) fusible link and smoke detector. Construct governor unit to be inoperative during normal door operations. Design release mechanism for easy resetting.
  - 1. Fabricate unit to permit manual lifting of curtain for emergency use after automatic closing, with curtain returning to closed position when released.

## 1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of coiling counter door. Include manufacturer's operating instructions and maintenance data.
- B. Shop Drawings: Submit shop drawings indicating location and size of each unit, details for special components, surrounding conditions and installations which are not fully dimensioned or detailed in manufacturer's data.
- C. Label Certification: Submit UL certification for fire rated doors and frames.

### 1.4 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

## PART 2 PRODUCTS

#### 2.1 MANUFACTURER

- A. Profiles and details shown on the drawings are those of Cornell Iron Works unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are The Cookson Company and Overhead Door Corp.
  - 1. Basis of Design: Cornell Iron Works Inc. fire-rated counter shutter model "ERC10."

## 2.2 MATERIAL DESCRIPTION

- A. Fabricate roll up counter curtain of interlocking flat slats fabricated from 22 ga. steel. Each slat to be fitted with endlocks to hold curtain in alignment. Bottom of curtain to be finished with stainless steel angle and lift handle and a continuous neoprene bumper to prevent counter abrasion.
- B. Furnish inserts and anchoring devices which must be built into masonry or drywall assemblies for the installation of the units. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.

## 2.3 CURTAIN ACCESSORIES

- A. Barrel and Counterbalance: Curtain to be coiled around a steel pipe fitted with involute shaped rings for ease of operation. Rings to be faced with suitable material to prevent curtain abrasion. Barrel to be of sufficient thickness and diameter to prevent deflection exceeding .03" per ft. Barrel to be supported by plate brackets. Helical, oil-tempered springs shall be installed inside the steel pipe, which shall rotate on self-lubricating bearings. Spring tension shall be adjusted in the field by means of an adjusting wheel.
- B. 18 ga. steel hood shall be provided to enclose mechanism and end brackets. Barrel shall be mounted as part of the complete assembly within the hood. At fire rated units, furnish automatic drop baffle to guard against passage of smoke or flame.
- C. Provide steel frame consisting of 16 ga. jambs and 14 ga. sill. Form grooves into sides of frames for retaining curtain.

D. All steel to have manufacturer's standard shop primed finish.

## 2.4 MOTOR OPERATOR

- A. Provide UL listed electric operator, size as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second.
  - 1. Operator Controls
    - a. Key operation with open, close, and stop controls.
    - b. Controls for interior location.
    - c. Controls flush mounted.
- B. Safety Edge Device: Provide each shutter with an electric safety switch, extending full width of shutter bottom, and located within a neoprene astragal mounted to the bottom rail. Contact with switch before fully closing will immediately stop the downward travel and reverse direction to the fully opened position.

### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where coiling counter doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

- A. Install units complete with necessary hardware, in accordance with final shop drawings, manufacturer's instructions, and as specified herein.
- B. Upon completion of installation, including work by other trades, test, lubricate and adjust doors to operate easily, free from warp, twist or distortion.
- C. Install fire rated units to comply with NFPA 80.

**END OF SECTION** 

#### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work. Note that while proposed substitutions to specified products or other changes to the work introduced by the Contractor or the Sub-Contractors will be considered, any such substitution must meet or exceed all stated environmental (GREEN BUILDING) criteria.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the overhead coiling doors as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Overhead coiling doors.
  - 2. Hardware and accessories.
  - 3. Motor operation.

## 1.3 RELATED SECTIONS

- A. Coiling Counter Doors Section 083313.
- B. Finish Hardware Section 087100.
- C. Electrical Division 26.

## 1.4 QUALITY ASSURANCE

- A. Furnish each overhead coiling door as a complete unit produced by one manufacturer, including hardware, accessories, mounting and installation components.
- B. Provide each type of overhead coiling door by one manufacturer for entire project.
- C. Wind Loading at Exterior Door: Design and reinforce exterior overhead coiling doors as to withstand the following wind loading pressures, unless otherwise indicated:
  - 1. Specified Design Wind Loads: Per FM Global Data Sheet 1-28 Wind Design
    - a. Student Center Addition
      - 1). Field (Zone 4): Inward 44.8 psf, Outward 47.6 psf.
      - 2). Corners (Zone 5): Inward 44.8 psf, Outward 55.9 psf.
    - b. Theater Building
      - 1). Field (Zone 4): Inward 40.0 psf, Outward 42.5 psf.
      - 2). Corners (Zone 5): Inward 40.0 psf, Outward 49.9 psf.
  - 2. A safety factor of 2.0 should be applied to the inward and outward design pressures obtained from DataSheet 1-28. The pressures listed in the table are the base design pressures and are not intended asultimate design pressures (with safety factor applied).

### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, roughing-in diagrams, and installation instructions for each type and size of overhead coiling door. Include operating instructions and maintenance information.
- B. Shop Drawings: Submit shop drawings for special components and installations which are not fully dimensioned or detailed on manufacturer's data sheets.
- C. Samples: Submit color and finish samples for finish type required.

## 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements.

#### PART 2 PRODUCTS

## 2.1 MANUFACTURER

- A. Profiles and details shown on the drawings are those of Cornell Iron Works unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are The Cookson Company and Overhead Door Corp. Provide sizes, configurations and fire ratings as indicated on drawings
  - 1. Basis of Design
    - a. Interior Fire-Rated Doors: Cornell Iron Works Inc. Alarm Guard Motor Operated Rolling Fire Door.
    - b. Exterior Coiling Door: "Thermiser Max" insulated door.

## 2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Shutter Curtain: Fabricate overhead coiling door curtains of interlocking flat slats designed to withstand required wind loading, of continuous length for width of doors, without splices. Provide slats of structural quality, minimum twenty (20) gauge cold-rolled galvanized steel sheets complying with ASTM A 924, Grade A, with G90 zinc coating, complying with ASTM A 653, and phosphate treated before fabrication.
  - Curtains for exterior doors shall be insulated with 1" urethane and 22 ga. back-up sheet.

- B. Endlocks: Malleable iron castings galvanized after fabrication, secured to curtain slats with galvanized rivets. Provide locks on alternate curtain slats for curtain alignment and resistance against lateral movement.
- C. Windlocks at Exterior Doors: Malleable iron castings secured to curtain slats with galvanized rivets. Provide windlocks on roll-up doors approximately twenty-four (24) inches o.c. on both edges of curtain.
- D. Bottom Bar: Consisting of two (2) angles, each not less than 1-1/2" x 1-1/2" x 1/8" thick, with electric sensing edge wirelessly connected to motor operator.
- E. Curtain Jamb Guides: Fabricate curtain jamb guides of steel angles, or channels and angles with sufficient depth and strength to retain curtain loading. Build up units with minimum 3/16" thick steel sections, galvanized after fabrication. Slot bolt holes for track adjustment.
  - Secure continuous wall angle to wall framing by 3/8" minimum bolts at not more than twenty-four (24) inches o.c. Extend wall angles above overhead coiling door opening head to support coil brackets, unless otherwise shown. Place anchor bolts on exterior wall guides so they are concealed when overhead coiling door is in closed position. Provide removable stops on guides to prevent over-travel of curtain, and continuous bar for holding windlocks.
- F. Weather Seals: Provide vinyl or neoprene weatherstripping for exterior doors. At door heads, use 1/8" thick continuous sheet secured to inside of curtain coil hood. At door jambs, use 1/8" thick continuous strip secured to exterior side of jamb guide.
- G. Automatic Closing Device for Fire-Rated Doors: Equip each fire-rated door with an automatic closing device that is inoperative during normal door operations and that has a governor and complying with NFPA 80 and an easily tested and reset release mechanism designed to be activated by the fir alarm system or interruption of power.

## 2.3 COUNTERBALANCING MECHANISM

- A. Counterbalance doors by means of adjustable steel helical torsion spring, mounted around a steel shaft and mounted in a spring barrel and connected to door curtain with required barrel rings. Use grease sealed bearings or self-lubricating graphite bearings for rotating members.
- B. Counterbalance Barrel: Fabricate spring barrel of hot-formed structural quality carbon steel, welded or seamless pipe, of sufficient diameter and wall thickness to support curtain without distortion of slats and limit barrel deflection to not more than 0.03" per foot of span under full load.
- C. Provide spring balance of one or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment

- accessible from outside barrel. Provide cast steel barrel plugs to secure ends of springs to barrel and shaft.
- D. Fabricate torsion rod for counterbalance shaft of cast-hardened steel, of required size to hold fixed springs ends and carry torsion load.
- E. Brackets: Provide mounting brackets of manufacturer's standards design, either cast iron or cold-rolled steel plate with bell mouth guide groove for curtain.
- F. Hood: Form to entirely enclose coiled curtain and operating mechanism at opening head, and act as weather seal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Provide closed ends for surface-mounted hoods, and any portion of between-jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.
  - 1. Fabricate steel hoods for doors of not less than twenty (20) gauge hot-dip galvanized steel sheet with G90 zinc coating, complying with ASTM A 525. Phosphate treat before fabrication.
  - 2. At fire rated assemblies furnish automatic drop baffle to guard against passage of smoke or flame.

#### 2.4 INSERTS AND ANCHORAGES

- A. Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of units. Provide setting drawings, templates, instructions and directions for installation of anchorage devices. Coordinate delivery with other work to avoid delay.
- B. Refer to concrete and masonry Sections of these specifications for installation of inserts and anchorage devices.

### 2.5 FINISH

- A. Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.
  - 1. Color: As selected by the Architect from manufacturers standard colors unless otherwise indicated on drawings.

# 2.6 ELECTRIC DOOR OPERATORS

A. Furnish electric door operator assembly of size and capacity recommended and provided by door manufacturer; complete with electric motor and factory pre-wired motor controls, gear reduction unit, solenoid operated brake, remote control stations,

- control devices, conduit and wiring from controls to motor and control stations, and accessories required for proper operation.
- B. Provide hand operated disconnect or a mechanism for automatically engaging a sprocket and chain operator and releasing brake for emergency manual operation. Mount disconnect and operator so they are accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.
- C. Design operator so that motor may be removed without disturbing limit switch adjustment and without affecting emergency auxiliary operator.
- D. Door Operator Type: Provide wall or bracket mounted door operator units consisting of electric motor, worm gear drive from motor to reduction gear box, chain or worm gear drive from reduction box to gear wheel mounted on counterbalance shaft, and a disconnect-release for manual operation. Provide motor and drive assembly of horsepower and design as determined by door manufacturer for size of door required.
- E. Electric Motors: Provide high starting torque, reversible, constant duty, Class A insulated electric motors with overload protection, sized to move overhead coiling door in either direction, from any position, at not less than 2/3 foot nor more than one (1) foot per second.
  - 1. Coordinate wiring requirements and current characteristics of motors with building electrical system.
  - 2. Furnish totally enclosed, non-ventilated type motors, fitted with plugged drain, and controller with NEMA Type 4 enclosure.
- F. Remote Control Station: Provide momentary contact, 3-button control station with push button controls labeled "open," "close," and "stop."
  - 1. Provide interior units, full-guarded, surface mounted, heavy duty, with NEMA Type 4 enclosure.
- G. Automatic Reversing Control: Furnish each door with automatic safety switch, extending full width of door bottom, and located within neoprene or rubber astragal mounted to bottom door rail. Contact with switch before fully closing will immediately stop downward travel and reverse direction to fully opened position. Connect to control circuit through retracting safety cord and reel, or self-coiling cable.
  - 1. Provide electrically actuated automatic bottom bar with wireless connection to the motor operator locking device at exterior door.

H. Curtain shall have cylinder locking device, including cylinder and 2 deadbolts, one at each end. Provide electric interlocks that prevent motor from operating when lock is engaged.

### PART 3 EXECUTION

# 3.1 INSPECTION

A. Examine the areas and conditions where overhead coiling doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

- A. Install overhead coiling door and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports in accordance with final shop drawings, manufacturer's instructions, and as specified herein.
- B. Upon completion of installation, including work by other trades, lubricate, test and adjust overhead coiling doors to operate easily, free from warp, twist or distortion and fitting weather-tight for entire perimeter.

**END OF SECTION** 



#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the aluminum entrances and storefronts as indicated on the drawings and/or specified herein, including the following:
  - 1. Exterior entrance systems.

- 2. Interior entrance systems.
- 3. Exterior storefront systems.

### 1.3 RELATED SECTIONS

- A. Joint Sealers Section 079200.
- B. Glazed Aluminum Curtain Walls Section 084413.
- C. Finish Hardware Section 087100.
- D. Glass and Glazing Section 088000.

#### 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements.
- B. Shop Drawings: Provide large scale shop drawings for fabrication, installation and erection of all parts of work. Provide plans, elevations, and details of anchorages, connections and accessory items. Provide installation templates for work installed by others. Show interfaces and relationships to work of other trades.
- C. Field Measurements: Take necessary field measurements before preparation of shop drawings and fabrication. Do not delay progress of job. If field measurements are not possible prior to fabrication, allow for field cutting and fitting.
- D. Initial Selection Samples: Submit samples showing complete range of colors, textures, and finishes available for each material used.
- E. Verification Samples: Submit representative samples of each material that is to be exposed in completed work. Show full color ranges and finish variations expected. Provide samples having minimum size of 144 sq. in.
- F. Calculations: Provide professionally prepared calculations and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied; refer to Article 1.5, para. D for further description.
- G. Test Reports: Provide certified test reports for specified tests.

#### 1.5 QUALITY ASSURANCE

- A. Source: For each material type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.
- B. Installer: A firm with a minimum of three years' experience in type of work required by this Section and which is acceptable to manufacturers of primary materials.
- C. Design Criteria: Drawings indicate sizes, member spacings, profiles, and dimensional requirements of work of this Section. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in the Architect's sole judgment, such deviations do not materially detract from the design concept or intended performances.
- D. Engineering: Provide services of a Professional Engineer, registered in State of Connecticut, to design and certify that work of this Section meets or exceeds performance requirements specified.

#### 1.6 TESTS AND PERFORMANCE REQUIREMENTS

- A. Manufacturer's Standard Tests: Provide manufacturer's standard test data showing compliance with specified requirements.
- B. Testing and performance data applies to exterior assemblies.
- C. Test Sequence: Test sequence is optional, except that air infiltration tests shall precede water resistance tests.
- D. Air Infiltration Test: Test unit in accordance with ASTM E 283, as follows:
  - Static Air Pressure Difference: 6.24 psf for fixed storefront units, and 1.567 psf for doors.
  - 2. Performance: Maximum air leakage shall not exceed the following:
    - a. Fixed Storefront Units: 0.06 cfm per sq. ft. of window area.
    - b. Door Units: 0.50 cfm per sq. ft. of single doors, 1.00 cfm per sq. ft. for doors hinged in pairs.
- E. Water Leakage Test: Test fixed framing system in accordance with ASTM E 331.
  - 1. Test Pressure: 6.24 psf.
  - 2. Performance: No leakage as defined in test method at specified test pressure.
- F. Uniform Load Deflection Test: Test units in accordance with ASTM E 330, at following static air pressure difference (Design Wind Pressure), or loads prescribed by code for

this project site, whichever is greater. Apply pressure first to exterior side (positive) and then interior side (negative).

- G. Specified Design Wind Loads: Per FM Global Data Sheet 1-28 Wind Design
  - 1. Student Center Addition
    - a. Field (Zone 4): Inward 44.8 psf, Outward 47.6 psf.
    - b. Corners (Zone 5): Inward 44.8 psf, Outward 55.9 psf.
  - 2. Theater Building
    - a. Field (Zone 4): Inward 40.0 psf, Outward 42.5 psf.
    - b. Corners (Zone 5): Inward 40.0 psf, Outward 49.9 psf.
  - A safety factor of 2.0 should be applied to the inward and outward design pressures obtained from DataSheet 1-28. The pressures listed in the table are the base design pressures and are not intended asultimate design pressures (with safety factor applied).
- H. Test Procedure: Procedure A as specified in ASTM E 330.
- I. Performance: Deflection in each member measured at locations of greatest deflection shall not exceed L/175 at specified Design Wind Pressure.
- J. Uniform Load Structural Test: Test units in accordance with ASTM E 330 at following static air pressure difference. Apply high pressure load first on one side and then on other side. At conclusion of test there shall be no glass breakage, permanent damage to fasteners, hardware parts, support arms or activating mechanisms.
  - 1. Static Air Pressure: Minimum 1.5 times the Design Wind Pressure.
  - 2. Permanent Deformation in Any Member: Not to exceed 0.2% of member span.
- K. Condensation Resistance Factor: Not less than <u>45</u> for fixed storefront units, and not less than 48 for doors; per AAMA 1502.7.
- L. Thermal Movement: Provide storefront systems that allow for expansion and contraction of members throughout an ambient temperature range of 120 degrees F.
- M. Seismic Loads: Provide entrance and storefront systems, including anchorage, capable of withstanding the effects of earthquake motions calculated according to requirements of authorities having jurisdiction or ASCE 7, "Minimum Design Loads for Buildings and Other Structures," Section 9, "Earthquake Loads," whichever are more stringent.

N. Field Testing: Contractor will be responsible for field testing a minimum of two locations for water penetration in accordance with AAMA 501.12. The contractor will be responsible for any tests that do not pass.

# 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations. Store under cover and protect from weather damage.
- B. Sequence deliveries to avoid delays, but minimize on-site storage.

#### 1.8 WARRANTIES

- A. Provide written warranty, signed by manufacturer, agreeing to repair or replace work that exhibits defects in materials or workmanship. "Defects" is defined to include, but not be limited to, leakage of water, abnormal aging or deterioration, abnormal deterioration or fading of finishes, and failure to perform as required. Include requirement for removal and replacement of covering and connected adjacent work.
  - 1. Warranty Period: Five (5) years from date of Substantial Completion for materials and workmanship; except finish shall be warranted for a period of fifteen (15) years from date of Substantial Completion. Refer to Section 088000 for warranty requirements for insulating glass.

### PART 2 PRODUCTS

# 2.1 ACCEPTABLE MANUFACTURERS/PRODUCTS

- A. Profiles and details shown on the drawings are those of Kawneer North America unless otherwise noted; Provide storefronts and entrance systems of one of the following manufacturers that meet or exceed requirements of these specifications:
  - Oldcastle Building Envelope.
  - 2. Tubelite, Inc.
  - 3. YKK AP America, Inc.

### B. Products:

- 1. Exterior frame system shall be Series 451T manufactured by Kawneer, or by one of the manufacturers listed above.
- 2. Doors for interior and exterior application shall be "Wide Stile 500" manufactured by Kawneer, or by one of the manufacturers listed above.

#### 2.2 MATERIALS AND ACCESSORIES

- A. Aluminum Members: Provide 6063-T5 alloy and temper as recommended by manufacturer for strength, corrosion resistance, and application of required finish. Comply with ASTM B 221 for extrusions, and ASTM B 209 for sheet/plate. Provide 0.125" thick extrusions for door stiles and storefront framing. Provide 0.050" thick aluminum for glazing moldings.
  - 1. Structural aluminum shapes shall conform to ASTM B 308.
- B. Fasteners: Provide non-magnetic stainless steel fasteners, warranted by manufacturer to be non-corrosive and compatible with aluminum components.
- C. Concealed Flashing: Dead-soft stainless steel, 26 gauge minimum, or extruded aluminum 0.062" minimum, of an alloy and type selected by manufacturer for compatibility with other components.
- D. Brackets and Reinforcements: Non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.
- E. Concrete/Masonry Inserts: Cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 386.
- F. Bituminous Coatings: Cold-applied asphalt mastic compounded for 30-mil thickness per coat.
- G. Compression Weatherstripping: Manufacturer's standard replaceable stripping of molded neoprene or PVC gaskets complying with ASTM D 2287.
- H. Sliding Weatherstripping: Manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing.

#### 2.3 HARDWARE

A. Provide hardware units as indicated, scheduled, or required for operation of each door. Refer to Section 087100, Finish Hardware for hardware description.

### 2.4 FABRICATION

- A. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, are indicated on Drawings. Any variable dimensions are indicated, together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.
- B. Prefabrication: To greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.

- 1. Preglaze door and frame units to greatest extent possible, in coordination with installation and hardware requirements.
- 2. Do not drill and tap for surface-mounted hardware items until time of installation at project site.
- 3. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work in manner which prevents damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.
- C. Welding: Comply with recommendations of American Welding Society to avoid discoloration; grind exposed welds smooth and restore mechanical finish.
- D. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator to prevent corrosion.
- E. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.
- F. Fasteners: Conceal fasteners.
- G. Provide EPDM/vinyl blade gasket weatherstripping in bottom exterior door rail, adjustable for contact with threshold.
- H. At interior doors and other locations without weatherstripping, provide neoprene silencers on stops to prevent metal-to-metal contact.
- I. Provisions shall be made in the framing for minimum edge clearance, nominal edge cover, and nominal pocket width for the thickness and type of glazing installed, and shall be in accordance with the FGMA Glazing Manual.
- J. Pocket glazed framing shall provide:

		Single Glass	Insulating Glass
1.	Nominal edge cover (or bite) framing only	5/16"	1/2"
2.	Min. nominal edge clearance	1/8"	1/4"
3.	Min. face clearance	1/8"	5/32"

## 2.5 STOREFRONT FRAMING

- A. General: Provide inside-outside matched resilient flush glazed system with provisions for glass replacement. Shop fabricate and preassemble frame components where possible.
- B. Thermal-Break Construction: Fabricate exterior aluminum storefront framing system with integrally concealed, low conductance thermal barrier, located between exterior

materials and exposed interior members, in manner which eliminates direct metal-tometal contact. Provide manufacturer's standard construction which has been in use for similar projects for at least three years.

C. For glass and glazing, refer to Section 088000.

### 2.6 ALUMINUM DOORS

- A. Aluminum entrance doors shall be wide stile factory-glazed aluminum doors, manufactured by same manufacturer as storefront framing.
- B. Aluminum entrance doors shall be stile and rail type swing doors. Aluminum shall be extruded aluminum conforming to ASTM B 221, 0.125" thick for door stiles and 0.050" thick for glazing molding.
  - 1. Sections shall be of sizes and profiles indicated; shall present straight, sharply defined lines and arrises; and shall be free from defects impairing strength, durability, and appearance.
  - 2. Fasteners where exposed shall be aluminum, stainless steel, or plated steel conforming to ASTM A 164.
- C. Each door shall be factory glazed set in neoprene glazing gasket, refer to Section 088000 for glass.
- D. Doors shall meet the following resistance to corner racking when tested by the Dual Moment Load Test.
  - 1. Test section shall consist of a standard top door corner assembly. Side rail section shall be 24" long and top rail section shall be 12" long.
  - 2. Anchor top rail positively to test bench so that corner protrudes 3" beyond bench edge.
  - 3. Anchor a lever arm positively to side rail at a point 19" from inside edge of top rail. Attach weight support pad at a point 19" from inner edge of side rail.
  - 4. Test section shall withstand a load of 235 lbs. on the lever arm before reaching the point of failure, which shall be considered a rotation of the lever arm in excess of 45 deg.
- E. Air Infiltration (applies only to single acting offset pivot or butt hung entrances): Air infiltration shall be tested in accordance with ASTM E 283, at a pressure differential of 1.567 psf. A single 3'-0" x 7'-0" entrance door and frame shall not exceed 0.50 cfm per linear foot of perimeter crack. A pair of 6'-0" x 7'-0" entrance doors and frame shall not exceed 1.0 cfm per linear foot of perimeter crack.
- F. For door hardware, refer to Section 087100.

- G. Door bottom rail of exterior doors shall have an EPDM blade gasket sweep strip applied with concealed fasteners.
- H. Corner construction shall consist of mechanical clip fastening, SIGMA deep penetration and fillet welds. Glazing stops shall be hook-in type with EPDM glazing gaskets.
- I. The door weatherstripping on a single acting offset pivot or butt hung exterior door and frame (single or pairs) shall be thermoplastic elastomer weatherstripping on a tubular shape with a semi-rigid polymeric backing.
- J. The door weatherstripping on a double acting, center pivoted door and frame (single or pairs) shall be pile cloth. The door bottom rail shall be weatherstripped with an EPDM blade gasket sweep strip applied with concealed fasteners.
- K. The meeting stiles on pairs of doors shall be equipped with an adjustable astragal.

#### 2.7 FINISH

- A. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
  - Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.
  - 2. Custom color and gloss as selected by the Architect.

### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where aluminum entrances and storefronts are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

A. Install aluminum entrance doors and storefront framing in openings prepared under other Sections plumb, square, level, in exact alignment with surrounding work, with proper clearances, and securely and positively anchored to building structure, to meet

- performance requirements specified herein, in accordance with manufacturer's published instructions and approved submittals.
- B. Use only skilled mechanics for erection, under supervision of manufacturer's representative.
- C. Provide protection against galvanic action. Isolate dissimilar materials with bituminous coating or non-absorptive dielectric tape.
- D. Install aluminum entrance doors, storefront frame, and finish hardware. Carefully fit and adjust doors and hardware to frames and weatherstripping. After erection check and adjust operating hardware for smooth and proper operation.
- E. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction, unless otherwise indicated. Comply with requirements of Section 079200.
- F. Erection Tolerances: Install entrance and storefront systems to comply with the following maximum tolerances.
  - 1. Variation from Plane: Limit variation from plane or location shown to 1/8" in 12 feet; 1/4" over total length.
  - 2. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16". Where surfaces meet at corners, limit offset from true alignment to 1/32".
  - 3. Diagonal Measurements: Limit difference between diagonal measurements to 1/8".

### 3.3 PROTECTION AND CLEANING OF ALUMINUM

- A. Protect finished metal surfaces from damage during fabrication, shipping, storage, and erection, and from then until acceptance by Owner.
- B. Clean metal surfaces promptly after installation, exercising care to avoid damage. Remove excess sealant, dirt, and other substances. Lubricate hardware and other moving parts.

### 3.4 PROTECTION AND CLEANING OF GLASS

- A. Replace glass that is broken, cracked or chipped prior to time of final acceptance of Project by Owner.
- B. Clean glass surfaces promptly after installation, exercising care to avoid damage to same.

**END OF SECTION** 

### PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the interior and exterior all glass doors, as shown on the drawings, and/or specified herein, as needed for a complete and proper installation, including the following:
  - 1. Interior
    - a. Tempered glass doors.

- b. 10" bottom rail.
- c. Top patch fittings.
- d. Tempered glass with fittings.
- e. Exiting hardware.
- f. Locks.

#### 1.3 RELATED SECTIONS

- Glazed aluminum curtain walls Section 084413.
- B. Finish hardware Section 087100.
- C. Glazed metal partition system Section 102219.

### 1.4 QUALITY ASSURANCE

A. Qualifications of Installers: For actual installation of doors, use only personnel who are thoroughly trained and experienced in installation of the selected products and who are completely familiar with the requirements of this work.

#### 1.5 PERFORMANCE REQUIREMENTS

- A. Provide systems, including anchorage, capable of withstanding loads indicated without structural failure, deflection exceeding specified limit, support components transferring stresses to glazing, and glazing-to-glazing or glazing-to-support contact as determined by structural analysis.
  - 1. Structural Loads:
    - a. Wind Load: See Section 084413.
  - 2. Deflection Normal to Glazing Plane: Limited to 1/175 of clear span or 3/4" whichever is smaller.

#### 1.6 SUBMITTALS

- A. LEED Building Submittal Requirements: The Contractor or subcontractor shall submit the following LEED Building certification items:
  - A completed LEED Building Materials Certification Form, per Section 013300, "Submittals," under the LEED Building Submittal Requirements article of these specifications. Information to be supplied includes:
    - a. The percentage by weight of recycled content in the product(s). Identify post-consumer and/or pre-consumer recycled content.
    - b. The manufacturing location for the product(s) and the location (source) of the raw materials used to manufacture the product(s).

- c. Material costs for the materials included in the Contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.
- 2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
- 3. Product Cut Sheets for all materials that meet the LEED Performance Requirements this Section.
- 4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to, adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted. (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer's literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content.)
- B. Product Data: For each type of product specified. Include details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- C. Shop Drawings: Show details of fabrication and installation, including the following:
  - 1. Plans, elevations, and sections.
  - 2. Details of fittings.
  - 3. Hardware quantities, locations, and installation requirements.
  - 4. Anchorages and reinforcement.
  - Glazing details.
- D. Samples for Verification: Of size indicated below and of same thickness and material indicated for Work. Show the full range of color and texture variations expected.
  - 1. Metal Finishes: 6-inch long sections of patch fittings, rails, and other items.
  - 2. Glass: 6 inches square showing exposed-edge finish.

# 1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during and after installation and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

#### 1.8 PROJECT CONDITIONS

A. Field Measurements: Verify opening dimensions of all-glass entrances by field measurements before fabrication and indicate measurements on Shop Drawings.

#### 1.9 WARRANTY

- A. Submit a written warranty executed by the manufacturer agreeing to repair or replace components of all-glass entrances that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
  - 1. Structural failures.
  - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 3. Failure of operating components to function normally.
- B. Warranty Period: 2 years from date of Substantial Completion.

#### PART 2 PRODUCTS

# 2.1 MANUFACTURERS

A. Profiles and details shown on the drawings are those of Blumcraft (Basis of Design). Subject to compliance with requirements specified, other acceptable manufacturers are CR Lawrence and JE Berkowitz.

#### 2.2 MATERIALS

- A. Clear Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), Class 1 (clear) requirements. Provide products of thickness indicated that have been tested for surface and edge compression according to ASTM C 1048 and for impact strength according to CPSC 16 CFR, Part 1201 for Category II materials.
  - 1. Thickness: 1/2 inch clear glass, low iron.
  - 2. Exposed Edges: Flat polished. No exposed edges.
  - 3. Corner Edges: Mitered.
- B. Stainless Steel: ASTM A 666, Type 302 or Type 304; No. 4 finish.

### 2.3 COMPONENTS

- A. Fittings: Provide fittings and accessories for all-glass entrances of configurations shown on drawings fabricated of stainless steel, minimum 12 ga.
- B. Anchors and Fastenings: Manufacturer's standard concealed anchors and fastening.

C. Weather Stripping: Manufacturer's standard sweep-type weather stripping.

### 2.4 HARDWARE

A. See Section 087100.

#### 2.5 FABRICATION

- A. General: Fabricate all-glass entrance components in sizes, profiles, and configurations indicated.
  - Provide holes and cutouts in glass to receive hardware, fittings, rails, and accessories before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.
  - 2. Fully temper glass using horizontal roller hearth process.
  - Factory assemble components and factory install hardware to greatest extent possible.

#### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where all glass doors are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

- A. Install all-glass entrances and associated components according to manufacturer's written instructions; coordinate installation with structural glass wall fabricator.
- B. Set units level and plumb.
- C. Maintain uniform clearances between adjacent components.
- D. Lubricate hardware and other moving parts according to manufacturer's written instructions.
- E. Set, seal, and grout floor closer cases as required by hardware and substrate.

### 3.3 ADJUSTING AND CLEANING

A. Adjust doors and hardware to provide tight fit at contact points and weather stripping, smooth operation, and weathertight closure.

# 3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer that ensure all-glass entrances are without damage or deterioration.

**END OF SECTION** 

## PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the aluminum and glass curtain wall as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Aluminum and glass stick-type curtain wall assemblies.
  - 2. Spandrel glass panels.

- 3. Aluminum panels.
- 4. Glass and glazing in conjunction with the work of this Section.
- 5. Spandrel insulation, fire separation, fire safing and smoke stop.
- 6. All necessary steel or aluminum members where required to support, strengthen and/or reinforce aluminum members.
- Sealants, caulking, joint fillers, gaskets, fasteners, vents and weeps, weep tubes, bellows, closures, gutters, end dams, flashings, trim, as shown or as may be required in conjunction with the system or to joint the system to adjacent construction.
- 8. All brake metal flashing in contact with curtain wall assembly by curtain wall Contractor.
- 9. Anchors, inserts and insert setting diagrams, furnishing of inserts and insert setting diagrams, support brackets, reinforcing, bracing, stiffeners, flashing.
- 10. Shop drawings engineering calculations, erection drawings, samples and conformance test data.
- 11. Field check for water leakage.
- 12. Protection and cleaning, as defined herein.
- 13. Field measurements of adjacent and/or supporting construction and verification of existing conditions.

### 1.3 RELATED SECTIONS

- A. Aluminum Composite Wall Panels Section 074243.
- B. Joint Sealers Section 079200.
- C. Glazing other than in conjunction with the metal work of this Section Section 088000.
- D. Louvers Section 089000.

#### 1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by manufacturer's documented performance criteria and field testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

- 1. Glazed aluminum curtain walls shall withstand movements of supporting structure and deflection from uniformly distributed and concentrated live loads.
- 2. Failure also includes the following:
  - a. Thermal stresses transferring to building structure.
  - b. Glass breakage.
  - c. Noise or vibration created by wind and thermal and structural movements.
  - d. Loosening or weakening of fasteners, attachments, and other components.
  - e. Failure of operating units.
- B. Delegated Design: Design glazed aluminum curtain walls, including comprehensive engineering analysis by a qualified professional engineer licensed in the State of Connecticut, including, but not limited to story drift, twist, column shortening, long term creep, using performance requirements and design criteria indicated.
- C. Specified Design Wind Loads (unless greater required by Code): Per FM Global Data Sheet 1-28 Wind Design
  - 1. Student Center Addition
    - a. Field (Zone 4): Inward 44.8 psf, Outward 47.6 psf.
    - b. Corners (Zone 5): Inward 44.8 psf, Outward 55.9 psf.
  - 2. Theater Building
    - a. Field (Zone 4): Inward 40.0 psf, Outward 42.5 psf.
    - b. Corners (Zone 5): Inward 40.0 psf, Outward 49.9 psf.
  - A safety factor of 2.0 should be applied to the inward and outward design pressures obtained from DataSheet 1-28. The pressures listed in the table are the base design pressures and are not intended asultimate design pressures (with safety factor applied).
- D. Structural-Test Performance: Test according to ASTM E 330 as follows:
  - 1. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
  - 2. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
  - 3. Test Durations: As required by design wind velocity, but not less than 10 seconds.
- E. Deflection of Framing Members: At design wind pressure, as follows:

- 1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
- 2. Deflection Parallel to Glazing Plane: Limited to L/360 of clear span or 1/8 inch, whichever is smaller.
  - a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
- 3. Cantilever Deflection: Where framing members overhang an anchor point, limit deflection to two times the length of cantilevered member, divided by 175.
- F. Windborne-Debris-Impact-Resistance Performance: Pass missile-impact and cyclic-pressure tests when tested according to ASTM E 1886 and testing information in ASTM E 1996 for Wind Zone in which Project is located.
  - 1. Large-Missile Test: For glazed openings located within 30 feet of grade.
  - 2. Small-Missile Test: For glazed openings located more than 30 feet above grade.
- G. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.
- H. Story Drift: Accommodate design displacement of adjacent stories indicated.
  - 1. Design Displacement: H/400.
  - 2. Test Performance: Meeting criteria for passing based on building occupancy type when tested according to AAMA 501.4 at 1.5 times the design displacement.
- I. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
- J. Water Penetration under Dynamic Pressure: No evidence of water penetration through fixed glazing and framing areas when tested according to AAMA 501.1 at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
  - Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that is drained to exterior.

- K. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
  - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
  - 2. Test Interior Ambient-Air Temperature: 75 deg F.
  - 3. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested according to AAMA 501.5.
- L. Energy Performance: Glazed aluminum curtain walls shall have certified and labeled energy performance ratings in accordance with NFRC.
  - Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.45 Btu/sq. ft. x h x deg F as determined according to NFRC 100.
  - Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.37 as determined according to NFRC 200.
  - 3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area as determined according to ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft.
  - 4. Condensation Resistance: Fixed glazing and framing areas shall have an NFRC-certified condensation resistance rating of no less than 65 as determined according to NFRC 500.
- M. Sound Transmission: Provide glazed aluminum curtain walls with fixed glazing and framing areas having the following sound-transmission characteristics:
  - Outdoor-Indoor Transmission Class: Minimum 30 when tested for laboratory sound transmission loss according to ASTM E 90 and determined by ASTM E 1332.
- N. Dimensional Tolerances: Provide glazed aluminum curtain wall system, including anchorage, that accommodates dimensional tolerances of building frame and other adjacent construction.
- O. Field Testing: Contractor will be responsible for field testing a minimum of four locations chosen by the owner for air infiltration and water penetration in accordance with ASTM E783 and ASTM E1105. The contractor will be responsible for repeat testing of any areas that do not pass.

#### 1.5 SUBMITTALS

- A. Submit Product Data for each product specified, including details of construction relative to materials, dimensions of individual components, profiles, and finishes.
- B. Submit Shop Drawings showing fabrication and installation of glazed aluminum curtain wall system including plans, elevations, sections, details of components, and attachments to other units of Work.
  - 1. For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by a professional engineer licensed in the State of Connecticut responsible for their preparation.
- C. Submit samples for verification of each type of exposed finish required in manufacturer's standard sizes. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
- D. Submit cutaway sample of each vertical-to-horizontal intersection of system, made from 12-inch lengths of full-size components and showing details of the following:
  - 1. Joinery.
  - 2. Anchorage.
  - 3. Expansion provisions.
  - 4. Glass and glazing.
  - 5. Flashing and drainage.
- E. Submit welder certificates indicating that welders comply with requirements specified in "Quality Assurance" Article.
- F. Submit installer certificates signed by manufacturer certifying that installers comply with requirements in "Quality Assurance" Article.
- G. Submit product test reports from a qualified independent testing agency evidencing compliance of glazed aluminum curtain wall system with requirements based on comprehensive testing of manufacturer's current system.
- H. Submit test reports, calculations, computer analysis and other necessary data from a qualified independent inspecting and testing agency retained by the Contractor indicating compliance with performance requirements of glazed aluminum curtain wall system.

# 1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: To qualify for approval, an independent testing agency must demonstrate to Architect's satisfaction, based on evaluation of agency-submitted

- criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of glazed aluminum curtain wall systems that are similar to those indicated for this Project in material, design, and extent.
- C. Installer Qualifications: Engage an experienced installer to assume engineering responsibility and perform work of this Section who has specialized in installing glazed aluminum curtain wall systems similar to those required for this Project and who is acceptable to manufacturer.
  - Engineering Responsibility: Engage a qualified professional engineer to prepare
    or supervise the preparation of data for glazed aluminum curtain wall systems,
    including drawings, testing program development, test-result interpretation, and
    comprehensive engineering analysis that shows systems' compliance with
    specified requirements.
- D. Source Limitations: Obtain each type of glazed aluminum curtain wall system from one source and by a single manufacturer.
- E. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sight lines and relationships to one another and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, or in-service performance.
  - Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval and only to the extent needed to comply with performance requirements. Where modifications are proposed, submit comprehensive explanatory data to Architect for review.
- F. Welding Standards: Comply with applicable provisions of AWS D1.2, "Structural Welding Code--Aluminum."
  - 1. Engage welders who have satisfactorily passed AWS qualification tests for welding processes involved and who are currently certified for these processes.
- G. Mockups: Prior to installing glazed aluminum curtain wall system, construct mockups for each form of construction and finish required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for Work.

- 1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
- 2. Notify Architect 7 days in advance of the dates and times when mockups will be constructed.
- 3. Demonstrate the proposed range of aesthetic effects and workmanship.
- 4. Obtain Architect's approval of mockups before start of Work.
- 5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - a. Approved mockups in an undisturbed condition may become part of the completed Work.
- H. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Section 013119, "Project Meetings." Review methods and procedures related to glazed aluminum curtain wall system including, but not limited to, the following:
  - 1. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
  - 2. Review structural loading limitations.
  - 3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
  - 4. Review required inspecting, testing, and certifying procedures.
  - 5. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions.

### 1.7 PROJECT CONDITIONS

- A. Field Measurements: Verify dimensions by field measurements before fabrication and show recorded measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - Where field measurements cannot be made without delaying the Work, guarantee dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to guaranteed dimensions.

#### 1.8 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Warranty: Submit a written warranty executed by the manufacturer agreeing to repair or replace components of a glazed aluminum curtain wall system that fail in materials or workmanship within the specified warranty period. Failures include, but are not limited to, the following:
  - 1. Structural failures including, but not limited to, excessive deflection.
  - 2. Noise or vibration caused by thermal movements.
  - 3. Failure of system to meet performance requirements.
  - 4. Failure of operating components to function normally.
  - 5. Water leakage.
  - 6. Glazing breakage.
- C. Warranty Period: 10 years from date of Substantial Completion (except as noted below).
- D. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
  - 1. Deterioration includes, but is not limited to, the following:
    - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
    - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
    - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
  - 2. Warranty Period: 20 years from date of Substantial Completion.

### PART 2 PRODUCTS

## 2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide "1600 Wall System" of depths indicated, as manufactured by Kawneer Company, Inc. of Wausau Window and Wall Systems "Superwall", "750 XT" YKK AP America, Inc., or approved equal.

B. System Type: Aluminum stick-type glazed aluminum curtain wall with interior and exterior exposed metal framing.

#### 2.2 METALS

- A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated, complying with the requirements of standards indicated below.
  - 1. Sheet and Plate: ASTM B 209.
  - 2. Extruded Bars, Rods, Shapes, and Tubes: ASTM B 221.
  - 3. Extruded Structural Pipe and Tubes: ASTM B 429.
  - 4. Structural Profiles: ASTM A 1008.
  - 5. Welding Rods and Bare Electrodes: AWS A5.10.
- B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard.
  - 1. Structural Shapes, Plats, and Bars: ASTM A 36.
  - 2. Cold Rolled Sheet and Strip: ASTM A 1008.
  - 3. Hot Rolled Sheet and Strip: ASTM A 1011.

#### 2.3 FRAMING

- A. Framing Members: Extruded or formed aluminum framing members of thickness required and reinforced as required to support imposed loads.
  - 1. Construction: Thermally broken.
  - 2. Glazing System: Retained mechanically with gaskets on four sides.
  - 3. Glazing Plane: Front.
- B. Brackets and Reinforcements: Manufacturer's standard high strength aluminum with non-staining, non-ferrous shims for aligning system components.
- C. Fasteners and Accessories: Manufacturer's standard corrosion resistant, non-staining, non-bleeding fasteners an accessories compatible with adjacent materials.
  - 1. Use self locking devices where fasteners are subject to loosening o turning out from thermal and structural movements, wind loads, or vibration.

- 2. Reinforce members as required to receive fastener threads.
- 3. Use exposed fasteners with countersunk Phillips screw heads, finished to mach framing system.
- D. Anchors: Three way adjustable anchors with minimum adjustment of 2" that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
  - Concrete and Masonry Inserts: Hot dip galvanized cast iron, malleable iron, or steel inserts complying with ASTM A 123 or ASTM A 153 requirements.

### 2.4 GLASS

- A. Glass shall be of the types and minimum thickness, as shown on the drawings and specified herein, and shall, in addition, meet the requirements of the following paragraphs.
- B. All glass shall be the manufactured product of one (1) company. All fabricated glass products shall be the fabricated and coated products of one (1) company. All glass shall be delivered to the site bearing the manufacturer's label, complete with glazing instructions where applicable.
- C. Insulating glass units shall be 1" thick (minimum), consisting of two lites of 1/4" (minimum) glass separated by a desiccant filled metal spacer with welded, fused, soldered or bent corners and welded, fused or soldered splices or joints to provide a 1/2" hermetically sealed and dehydrated space. Insulating glass shall be dual seal and certified for compliance with seal classification "CBA" by the Insulating Glass Certification Council (IGC) and tested in accordance with the following ASTM Test methods. Secondary seal on structural silicone glazed units shall be a special silicone edge seal certified for use in structural silicone glazing applications over the temperature range and structural loading as called for under the performance criteria section of this Specification.
  - 1. ASTM E 2190 Standard Specification for Insulating Glass Unit Performance and Evaluation.
  - 2. ASTM E 546-88 Standard Test Method for Frost Point of Sealed Insulating Glass Units.
  - 3. ASTM E 576-88 Standard Test Method for Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
- D. The lites comprising insulating glass units shall be annealed, heat strengthened, (or fully tempered where required to meet wind load or safety glazing requirements), as shown, specified, required, or recommended by the specified glass fabricator to insure against heat breakage and to assure adequate glass performance at the specified design pressures specified under the performance criteria herein.

- E. Glass shall conform to the requirements of ASTM C 1036. Heat strengthened and tempered glass shall conform to the requirements of ASTM C 1048. Tempered glass shall also conform to ANSI Z97.1-1975. All heat strengthening and tempering shall be by the horizontal process, and processed in such a manner as to have all roller distortion in a horizontal direction as installed on the building.
- F. Fully tempered glass shall be heat soaked to EN 14179-1:2005-European Heat Soaking Standard. Glass manufacturer shall submit for approval their proposal for meeting this requirement. Heat soaked panes shall be marked to show they have been heat soaked.
- G. Where glass manufacturer cannot assure adequate structural performance of insulating glass units, based upon combination of inner/outer lite, assume outer lite alone must satisfy structural requirements. Method of installation must be in accordance with the manufacturer's published literature, as well as the latest standards of the FGMA and SIGMA. Method of installation shall make provision to weep all sill glazing rabbets.
- H. Contractor shall provide certification from glass producer/fabricator that glass producer/fabricator has reviewed all glazing details and thicknesses and finds same suitable for the purpose intended in accordance with these specifications. This shall include a written wind load and thermal stress analysis showing a probability of failure of no greater than 8 lites per thousand for conventional glazing and 4 lites per thousand for structural silicone glazing at the design loads and local climatic thermal conditions.
- I. Glass producer/fabricator shall make regular inspections (maximum interval semi-monthly) of glazing work in progress at the point of glazing for both mock-up and job production units to verify that glazing is proceeding in accordance with his recommendations. Glass producer/fabricator shall attend the mock-up test at no additional cost to the Owner.
- J. Insulating glass units shall be installed in such manner as to adequately drain the glazing rabbet in a manner, as approved in writing, by the insulating unit glass manufacturer.
- K. Contractor shall include in his design provision for reglazing vision lites with access from the interior except for structurally glazed lites which shall be reglazed from the exterior and spandrel lites with access from the exterior only. Mock-up shall include lites shop glazed in the initial installation as well as field glazed in the replacement mode.
- L. Glass deflection at full design load shall be limited to the lesser of L/100 or 3/4". In event specified glass cannot meet these requirements, Contractor shall submit calculations establishing anticipated deflections and reduction in glass bite as a consequence of deflections, along with his drawings. Submittal shall include a statement from glass manufacturer/fabricator that reduction in glass bite will not result.

in a reduction in load resistance capacity, an increase in breakage probability and that all specified warranties shall remain in effect.

M. Glass Types: Refer to drawings and to requirements of Section 088000.

#### 2.5 GASKETS/WEATHERSTRIPPING

- A. All gaskets/weatherstripping shall be neoprene, except where used in contact with a silicone sealant. In contact with silicone sealants, gaskets and spacers shall be preformed heat cured silicone rubber, chemically compatible with the silicone sealant and suitable for the specific purpose intended or equal, as recommended by the sealant manufacturer and approved by the Architect. All gaskets/weatherstripping/spacers shall have continuous mechanical engagement to framing members; adhesive attachment is not acceptable. All weatherstrips and gaskets shall be continuous with vulcanized, molded corners where possible.
- B. Sponge gaskets/weatherstripping/spacers shall be extruded black neoprene or silicone rubber (or equal as provided for in 2.4 A) with a hardness of 40 + 5 durometer Shore A and conform to ASTM C 509-79 (for neoprene). Sponge gaskets shall be compressed 20% to 35% in the final installed position.
- C. Dense gaskets/weatherstripping shall be extruded black neoprene conforming to NAAMM SG-1-70 or silicone rubber (or equal as provided for in 2.4 A) with a hardness of 75 + 5 durometer Shore A for hollow profiles and 60 + 5 for solid profiles.

### 2.6 SEALANTS (NON-STRUCTURAL)

- A. All joints, which are sealed with sealant as part of the fabrication or erection procedure, shall be sealed with an approved butyl (concealed) or low modulus silicone (exposed or concealed) sealant in color to match the adjoining surfaces or as may be required by the Architect. All perimeter sealant (metal to adjacent construction) shall be low or medium modulus silicone sealant. Silicone sealant shall be as manufactured by General Electric, Dow Corning or Pecora. Butyl sealant shall be PTI 707.
- B. In using specified sealants, strictly observe the printed instructions of sealant manufacturer regarding joint size, limitations, backer rod, mixing, cleaning, surface preparation, priming and application. A primer shall be used, unless printed instructions advise to the contrary, and sealant manufacturer certifies that the use thereof will reduce its performance. Sealant shall not be applied when substrates are wet or when the temperature is below 40 deg. F.
- C. Care shall be exercised to insure against "Three Surface Adhesion." Bond breakers shall be provided where necessary.
- D. Contractor shall provide certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and finds same suitable for the purpose intended, compatible with and will not stain the surfaces with which they are in contact.

Statement as to compatibility, adhesion sufficiency and non-staining shall be accompanied by actual test results on production substrates performed in accordance with applicable ASTM procedures.

# 2.7 SEALANTS (STRUCTURAL)

- A. All components which are adhered with a structural silicone sealant/adhesive as part of the fabrication, glazing or erection procedure, shall be sealed/adhered with an approved structural silicone, as manufactured by General Electric, Dow Corning or Pecora and approved by the Architect. All glazing with structural silicone sealant/adhesive shall be accomplished in a shop wherever consistent with the design.
- B. In using specified sealants, strictly observe the printed instructions of sealant manufacturer regarding joint size, limitations, backer rod, mixing, cleaning, surface preparation, priming and application. A primer shall be used, unless printed instructions advise to the contrary. Sealant shall not be applied when substrates are wet or when the temperature is below 40 deg. F. Units shall not be moved until structural silicone seal has achieved full cure.
- C. Care shall be exercised to insure against "Three Surface Adhesion." Bond breakers shall be provided where necessary.
- D. Contractor shall provide certification from sealant manufacturer that the sealant manufacturer has reviewed all sealant details and tested all contact surfaces, and finds same suitable for use with proposed sealant, the purpose intended and compatible with the surfaces with which they are in contact. Sealant manufacturer's certification shall include the following based upon tests performed on production run materials:
  - 1. Test data of adhesion to production samples of metal and glass, tested in accordance with ASTM C 794.
  - 2. Compatibility statement that the materials in contact with the sealant such as gaskets, spacers, setting blocks, are compatible with the sealant after 21 days exposure to ultra violet, 2000 4000 (micro watt u.v. radiation).
  - 3. Stress statement that when exposed to the specified wind load the stress in the silicone sealant of dimensions shown does not exceed 20 psi with a safety factor of 6:1.
- E. Where silicone bonds to a metal or glass surface, the weakest element in the line of stress must have a minimum strength of 120 psi. For each combination of substrates submit report from an independent laboratory for tests performed in the following manner:
  - 1. Assemble and fully cure a minimum of 6 samples using actual substrates and a minimum sample length of 5".

- 2. Subject sample to a tensile load such that nominal stress on silicone is 20 psi, hold for one minute and remove load. Repeat for additional loadings, increasing nominal silicone stress by 20 psi with each successive loading. Continue until failure occurs or until 200 psi is successfully applied.
- All 6 samples must successfully withstand at least 120 psi. Report maximum stress and mode of failure. If one or more samples do not meet this criteria, revise failed element and repeat tests with 6 new samples. Repeat until all 6 samples are successfully tested.
- 4. Testing shall be performed in such a manner as to establish stress and safety factor over the temperature range described herein.
- 5. Prepare an outline for a quality assurance program for evaluation of adhesion and other physical attributes of sealants and submit to Architect for review and approval.
- 6. Program shall cover both initial testing of components for sealant adhesion and compatibility, etc., and also random testing of production run materials, etc. Include testing at full negative design pressure, one unit per one hundred units manufactured for the project. Also include methods which will be employed to monitor sealant application to insure full sealant contact. No sealant work shall be performed prior to approval of program.

### 2.8 GLAZING BLOCKS

- A. Provide setting blocks at the sill quarter points of all glass lites. Setting blocks shall be black dense neoprene or heat cured silicone rubber with a hardness of 80 to 90 durometer, Shore A, a minimum length of 4", and a minimum width, which will permit full support of both panes of glass in an insulating glass unit or a monolithic unit no matter how positioned within the glazing rabbet.
- B. Shims used in conjunction with setting blocks must be of the same materials, hardness, length and width as the setting blocks.
- C. Provide side blocks within the upper half of both jambs of all glass lites. Side blocks shall be black dense neoprene or heat cured silicone rubber with a 60 to 70 durometer, Shore A, or as recommended by the selected glass manufacturer. Provide 1/8" clearance between block and bearing surface.

### 2.9 MISCELLANEOUS MATERIALS

- A. Provide straps, plates and brackets, built-in inserts, as required for support and anchorage of the fabricated items to adjacent surfaces.
- B. Where steel reinforcement of units is required for strength or other unavoidable necessity and concealed within (encased) in aluminum sections or employed in potentially wetted areas, hot dip galvanize the pieces after fabrication with 2.0 ounce

- zinc coating, complying with ASTM A 123. All other steel reinforcement shall be coated with two (2) heavy coats of zinc rich primer in differing colors.
- C. Slip Joint Linings/Sleeves: Provide stainless steel sleeve spacers and/or suitable bearing pads, as required, to insure free movement between surfaces where expansion and deflection movements are intended. Provide "Eel Slip," "Nylatron" or high impact polystyrene shims or pads or equivalent plastic units of sizes and thicknesses (minimum 1/16" except 1/8" for "Eel Slip") recommended by the manufacturer to permanently prevent "freeze up" of joints. All sleeves, spacers, bracing pads and shims must be incombustible and rated by UL.
- D. Flashing required within the system shall be 26 ga. stainless steel.
- E. Flashing required to join the system to adjacent construction shall be 26 ga. stainless steel.
- F. Exterior Insulated Aluminum Panels: Manufacturer's standard laminated aluminum faced panels of 1" thickness. Panel shall be flat, with no deviation in any direction exceeding 1/16" in 2', or 1/8" for the entire panel.
  - 1. Face Sheets: Not less than 0.0249" thick and finished to match curtain wall faming.
  - 2. Concealed Back Sheets: Aluminum or galvanized steel.
  - 3. Stabilizer Sheets: 1/8" thick tempered hardboard.
  - 4. Core Material: Rigid mineral wool.
  - 5. Edge Condition: Prepared for glazing into framing and either sealed or vented to the exterior only.
- G. Interior: .125" Formed Aluminum closure" as shown in architectural drawings. back cut at corners

## 2.10 INSULATION AND FIRESAFING

- A. Provide thermal and fire separation insulation where shown and where required. Use U.S. Gypsum Thermafiber CW 90 curtain wall insulation or approved equal with a minimum thickness of 4" (or thicker if required to meet specified thermal performance) and the foil vapor barrier (permeability not to exceed 0.020 Perms) at interior surface and all edges. Provide insulation and "fire wrap" at mullions and/or stiffeners as required to meet overall thermal and condensation resistance requirements and as required by Code.
- B. Tape and seal all joints in vapor barrier and along edges and supports to insure continuous vapor barrier.

- C. Apply insulation utilizing welded or screw applied impaling pins and retaining clips. Adhesive attachment will not be accepted.
- D. Provide 5" thick (minimum) compacted four (4) PCF USG Thermafiber safing insulation at full perimeter at each floor level between floor edge and curtain wall to meet requirements of Building Code. Provide hourly rating as required by Code. Seal all edges with an approved fire resistant sealant to provide a continuous fire/smoke barrier.
- E. Insulation and firesafing shall be suitably isolated/separated from direct contact with spandrel glass.

### 2.11 THERMAL BREAK

A. Provide thermal break or thermally improved construction, complying with the requirements of these Specifications and which have been in service on comparable installations for no less than ten (10) years. Submit data to prove structural sufficiency over full exterior thermal range specified, and anticipated wind loading. In the event a structural thermal break is employed, manufacturer shall establish structural properties over full thermal range.

## 2.12 FABRICATION

- A. General: Fabricate glazed aluminum curtain wall system according to Shop Drawings. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.
- B. Forming: Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
- C. Prepare components to receive concealed fasteners and anchor and connection devices.
- D. Fabricate components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
- E. Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld before finishing components. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
- F. Glazing Pockets: Provide minimum clearances for thickness and type of glass indicated according to GANA's "Glazing Manual."

- G. Glazing Pockets: Provide minimum clearances for thickness and type of plastic sheet indicated according to plastic sheet manufacturer's recommendations.
- H. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- I. Frame Units: Factory assemble frame units according to Shop Drawings to greatest extent possible. Rigidly secure non-movement joints. Seal joints watertight, unless otherwise indicated. Assemble components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
  - 1. Install glazing according to approved Shop Drawings.
- J. All machining, cutting and welding shall be done before finish is applied.

### 2.13 ALUMINUM FINISHES

- A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. High-Performance Organic Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed aluminum surfaces and to cut ends of aluminum to comply with coating and resin manufacturer's written instructions.
  - Fluoropolymer Three-Coat System: Manufacturer's standard three-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat and clear top coat, color coat and top coat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-02.
    - a. Color and Gloss: As selected by Architect, custom color and gloss.

#### PART 3 EXECUTION

### 3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of glazed aluminum curtain wall system. Do not proceed with installation until unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for protecting, handling, and installing glazed aluminum curtain wall system. Do not install damaged components. Fit joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints. Seal joints watertight, unless otherwise indicated. Provide means to drain water to the exterior to produce a permanently weatherproof system.
- B. Metal Protection: Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
- C. Install components to drain water passing joints, condensation occurring in glazing channels, condensation occurring within framing members, and moisture migrating within the system to the exterior.
- D. Install framing members plumb and true in alignment with established lines and grades.
- E. Install factory-assembled frame units plumb and true in alignment with established lines and grades.
- F. Install column covers plumb and true in alignment with established lines and grades.
- G. Anchorage: After system components are positioned, fix connections to building structure as indicated on Shop Drawings.
  - 1. Provide separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
- H. Welding: Weld components to comply with referenced standard and Shop Drawings, unless otherwise indicated. Weld in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
- I. Install glazing according to approved Shop Drawings.
- J. Install sealant according to approved Shop Drawings. Comply with requirements of Section 079200, "Joint Sealants."

- K. Install firesafing in locations indicated. Comply with requirements of Section 078413, "Firestops and Smokeseals."
- L. Erection Tolerances: Install glazed aluminum curtain wall system to comply with the following maximum tolerances:
  - 1. Plumb: 1/16 inch in 10 feet; 1/8 inch in 40 feet.
  - 2. Level: 1/16 inch in 20 feet; 1/8 inch in 40 feet.
  - 3. Alignment: Where surfaces abut in line, limit offset from true alignment to 1/16 inch; where a reveal or protruding element separates aligned surfaces by less than 2 inches, limit offset to 1/4 inch.
  - 4. Location: Limit variation from plane or location shown on Shop Drawings to 1/8 inch in 12 feet; 1/4 inch over total length.

## 3.3 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage a qualified independent testing agency to perform testing indicated.
- B. Static air infiltration test(s) as well as the static pressure water test(s) shall be performed on 200 sq feet to determine if curtain wall meets performance requirements specified herein under Article 1.4.
- C. Test for water infiltration per AAMA 501.2. Test within the first 10% of work complete, area to be a minimum of 100 SF of wall and including a perimeter where CW adjoins masonry construction. Interior finishes must not interfere with observation of test area or be removed from test area. Not appropriate for operable windows and doors.
  - 1. This test (AAMA 501.2) shall be performed infield on new construction.
- D. Repair or remove Work that does not meet requirements or that is damaged by testing; replace to conform to specified requirements.

### 3.4 PROTECTION

A. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure glazed aluminum curtain wall system is without damage or deterioration at the time of Substantial Completion.

**END OF SECTION** 

#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the sound control windows as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Fixed control booth window.

#### 1.3 RELATED SECTIONS

A. Glass and Glazing - Section 088000.

#### 1.4 SUBMITTALS

A. Before proceeding with the manufacturing of the windows, the window contractor shall submit complete shop drawings showing installation details, for Architect's approval. These drawings shall also show elevations of windows, full-sized details of all sections of windows, collateral materials, details of anchorage, and hardware. Supplemental data includes instructions for storage, handling, and erection of windows.

## PART 2 PRODUCTS

## 2.1 CONTROL BOOTH WINDOW

A. General: Operable glazed window, factory glazed and sealed. Window system shall include: glass, aluminum framing and trim, and all accessory items as shown on the drawings and required for a complete installation, including caulking and anchorage to adjacent construction.

#### B. Glass

- 1. Glass lite at fixed, projection component of window system shall be 3/8" thick projection glass as specified in Section 088000.
- 2. Glass in operable components of window system shall be window manufacturer's standard 1" thick, clear insulating glass unit.
- 3. Glass shall be installed in an extruded neoprene U-channel set in the frame.
- C. Frames: Frame shall be free of defects impairing strength and durability. Finish shall be as selected by the Architect.
- D. Extruded Neoprene U-Channel: Extruded neoprene U-channel for use in control booth window assembly shall be used to contain glazing of specified width as called out in the drawings. Channel shall be applied continuously along the perimeter of the frame. Where joints occur, the edges shall be tightly butted in a slightly compressed condition. Corner joints shall be mitered. Adhesive to bond the channel to the frame shall be as recommended by the channel supplier.
  - 1. Channels shall be supplied by:
    - Hecht Rubber Corporation, Jacksonville, FL 904-731-3401
    - b. Lauren Manufacturing Company, New Philadelphia, OH 800-683-0676
    - c. Acme Rubber 800-222-2263

- E. Caulking: The perimeter of each window shall be caulked on both sides. The caulking shall be performed as a part of this work to insure overall performance of the window system.
- F. Acceptable Manufacturers Subject to compliance with requirements, provide Kawneer Series 8400TL (basis of design) or Wausau Windows (Series 4100) or Peerless Products (Series 9000).

# PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where sound control windows are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION

A. The sound control window shall be installed under direct supervision of the manufacturer or his representative using skilled mechanics. Anchorage to the building structure shall be in accordance with approved Shop Drawings.

**END OF SECTION** 



#### **PART 1 - GENERAL**

#### 1.1 Description

- A. Work Included: Provide sound retardant oversize swinging door systems where shown on drawings & as specified herein.
- **B. Related Work:** Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, & Sections in Division 1 of these Specifications.

Except for the items specifically listed in this Section, finish paint is furnished and applied under other sections of these Specifications

## 1.2 Quality Assurance

A. Experience: Provide work of this Section designed and furnished by one manufacturer. Use a manufacturer who is ISO9001:2000 certified and has been engaged in the manufacture of Sound Retardant Metal Swinging Door systems for at least five (5) years immediately prior to the start of this work, and who has a history of successful production acceptable to the Architect.

#### 1.3 Related Sections

- A. Section 09 90 00: Paints and Coatings
- B. Section 04 20 00: Unit Masonry

#### 1.4 References

- A. ASTM A1008: Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.
- B. ASTM A1011: Standard Specification for Steel, Hot-Rolled Sheet and Strip, Commercial.
- C. ASTM A653: Standard Specification for Steel Sheet, Zinc-coated (Galvanized) or Zinc-Iron alloy Coated (Galvannealed) by the Hot Dipped Process.
- D. ASTM B117: Standard Method of Salt Spray (Fog) Testing
- **E. ASTM D1735:** Standard Practice for Testing Water Resistance of Coating Using Water Fog Apparatus.
- F. ASTM E90: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss in Building Partitions.
- G. ASTM E336: Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.
- H. ASTM E413: Classification for Determination of Sound Transmission Class

# 1.5 Submittals

- **A. Shop Drawings:** Submit a schedule of items to be provided under this Section along with shop drawings in sufficient detail to show fabrication, installation, anchorage and interface of the work of this section with the work of adjacent trades.
- B. Certification: Provide certification that the door construction utilized has been tested at an independent laboratory in accordance with ASTM E90, and that the STC rating determined in accordance with ASTM E413, is not less than that specified in Part 2 of this Section. The laboratory referenced in the certification must be qualified under the National Voluntary Accreditation Program (NVLAP) of the U.S. Bureau of

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- Standards. Certification must reference laboratory name, test report number, and date of test; substitution of test data not in accordance with ASTM E90 and E413 will not be acceptable.
- **C. Installation Instructions:** Provide recommended installation procedures which, upon approval by the architect, will become the basis for acceptance or rejection of the actual procedures used for installation.
- **D. Warranty:** Upon completion of the work of this Section, provide the Architect with two (2) copies of the manufacturer's standard written one (1) year warranty.

#### **PART 2 - PRODUCTS**

#### 2.1 Design

- A. Design Basis & Type: Sound Retardant Metal Oversize Swinging Door System designs are based on those manufactured by Overly Door Company, Greensburg, PA 15601 (800-979-7300). Subject to compliance with requirements specified, other acceptable manufacturers are IAC Acoustics, North Aurora, IL (630-270-1790) or Krieger Specialty Products, Coatesville, PA 19320 (800-251-3396)
- **B.** Performance: Sound Retardant Metal Oversize Swinging Door System to be Overly Model No. (5192149) or equal with STC rating of 51 when tested as an operable system in accordance with ASTM E90 and ASTM E413.
- C. Components: Assemblies to be complete with metal frame, door(s), sealing system (based on model specified), MCL-3000 Cam-Lift hinges, multi-point manual camming latch device for active leaf, and chain/cane bolts for in-active leaf.

#### 2.2 Fabrication

- A. Materials: Sound Retardant Metal Oversize Swinging Doors and Frames to be constructed from formed sheet steel or structural shapes and bars. Sheet steel shall be commercial quality, level, cold rolled steel conforming to ASTM A1008 or hot rolled, pickled and oiled steel conforming to ASTM A1011. Steel shapes shall comply with ASTM A36 and steel bars with ASTM A108, Grade 1018. Exterior units shall be fabricated from Galvannealed material conforming to ASTM A653 (A60) with a coating weight of not less than 0.60 ounces per square foot.
- **B. Door Design:** Sound Retardant Metal Oversize Swinging Doors shall be of minimum thickness construction to achieve the STC rating with sizes as indicated on drawings. Face gauges, internal sound retardant core and perimeter door edge construction to be manufacturer's standard for the specified model. No lead or asbestos shall be permitted in door construction to achieve STC performance. Horizontal and/or vertical splices may be required based on overall size of door leafs. See drawings for height and width of door(s).
- C. Frame Design: Sound Retardant Metal Oversize Swinging Door Frames shall be fabricated from 8" channel iron minimum. Frames are to be provided knocked down with bolt together field splice in the head of the frame.
- D. Hardware Reinforcements: Factory mortise, reinforce, drill and tap and doors and frames for all mortise hardware as required by hardware manufacturer's template. Provide necessary reinforcement plates as required for surface mounted hardware; all drilling and tapping to be done in field by installer. Provide dust cover boxes on all frame mortises.
- **E. Hardware Mounting:** All hardware to be installed at the factory and then removed prior to shipment to prevent damage. All items to be clearly marked for re-installation in the field.
- **F. Anchors:** Provide suitable anchors to properly install frames in partition types shown on Architects drawings.

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**G.** Painting & Cleaning: After fabrication of frames, all tool marks and surface imperfections shall be removed and exposed faces of all welded joints dressed smooth. Chemically treat all surfaces to insure maximum paint adhesion and coat with a water-based rust-inhibitive primer.

#### **PART 3 - EXECUTION**

### 3.1 Site Storage & Protection of Materials

- **A. Receipt:** Upon receipt of product, all materials shall be thoroughly inspected and all discrepancies, deficiencies and/or damages shall be immediately reported to the supplier in writing.
- **B.** Storage: Store all materials on planks or dunnage in a dry location in a vertical position, spaced by blocking to permit air circulation between units. Cover all material or store in a controlled area to protect from damage.

#### 3.2 Installation

- A. Prior to installation, secure the services of a qualified representative of the manufacturer to visit the job site and instruct the contractor's personnel in proper installation and adjustment of the assemblies or secure services of manufacturer's factory trained and authorized installer to perform installation of assemblies.
- **B. Install work of this Section** in strict accordance with approved shop drawings and manufacturer's recommended installation instructions. Where installations require field welding, all work must be performed by certified welders in accordance with AWS D1.1/D1.3.
- **C. Upon installation**, secure the services of a qualified representative of the manufacturer to visit the jobsite and inspect the complete installation of the door and frame assemblies, test all components thru a minimum of ten (10) cycles of operation and direct installer in correcting any non-conforming items found.

### 3.3 Field Testing

A. Secure the services of a qualified Independent Testing agency to test door and frame installations selected by Owner/Architect in accordance with ASTM E336. Installed product shall perform no less than five (5) FSTC rating points below the specified STC rating. Any installations which fail to meet these criteria shall be examined, re-worked and re-tested until compliance is obtained.

**END OF SECTION 08 56 80** 

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### **PART 1 - GENERAL**

### 1.1 RELATED DOCUMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 WORK INCLUDED

- A. Work of this Section includes all labor, materials, equipment and services necessary to furnish all the finish hardware as shown on the drawings and specified herein.
- B. The required hardware items for doors are indicated in hardware sets shown herein. Should any opening be omitted, the contractor shall contact the Architect for the correct hardware.

# 1.3 SUBMITTALS:

- A. General: Submit the following in accordance with the provisions of the general contract documents.
- B. Hardware Schedule: Submit five (5) copies of the hardware schedule. Follow Door and Hardware Institute (DHI) guide lines for scheduling. At the beginning of the schedule furnish an index which list each door number with appropriate heading number and hardware set number. Furnish initial draft of schedule at the earliest possible date, in order to facilitate the fabrication of other work. Furnish final schedule after samples, manufacturer's data sheets have been approved. HORIZONTAL SCHEDULES WILL NOT BE ACCEPTED.
- C. Product Data: Submit five (5) copies of the manufacturer's data for each item of hardware. Include whatever information may be necessary to show compliance with requirements.
- D. Keying Schedule: A key schedule showing all key numbers and spaces to which each permits entry, shall be provided. Consult with OWNER before submitting final key schedule. After final approval has been received, the schedule and the key cabinet, along with the key gathering envelopes containing keys for each lock endorsed with lock number and space designation, shall be turned over to the OWNERS.
- E. Samples: Prior to submittal of the final hardware schedule and prior to delivery of hardware, submit one (1) sample of each exposed hardware unit. Samples will be reviewed by the ARCHITECT for design, color and texture only. Compliance with other requirements is the exclusive responsibility of the CONTRACTOR. Samples approved by the ARCHITECT shall be turned over to the OWNER.

F. Wiring Diagrams: Supplier shall furnish riser diagrams, wiring diagrams and point to point diagrams for all electrical hardware specified herein. These diagrams shall be included with the initial draft of the hardware schedule.

### 1.4 QUALITY ASSURANCE

- A. Standards: All finish hardware shall conform to all of the following standards:
  - 1. Testing Laboratories: Underwriters Laboratory (UL) and or Warnock Hersey Fire Laboratories Division: All fire rated doors shall have hardware assemblies approved by one of the listed laboratories. Panic hardware UL Listed only.
  - 2. National Fire Protection Association: NFPA 80 and NFPA 101.
  - 3. Builders Hardware Manufacturers Association (BHMA).
  - 4. American National Standards Institute (ANSI).
  - 5. American Disabilities Act (ADA).
- B. All products specified shall comply with the Buy American Act.
- C. Supplier: Finish hardware shall be furnished by those having a minimum of 5 years of builders hardware experience and shall have in their employ at least one certified Architectural Hardware Consultants (AHC) to correctly interpret the plans, detailed drawings and specifications.

### 1.5 PRODUCT HANDLING

- A. Handle, store, distribute, protect and install in accordance with the manufacturers instructions. Deliver packaged material in original containers with seals unbroken and labels intact. Deliver assemblies completely identified and with adequate protection for storage, handling and installation.
- B. Provide secure lock-up for hardware delivered to the project, but not yet installed. Control the handling and installation of hardware which are not immediately replaceable, so that completion of the work will not be delayed by hardware losses; both before and after installation.

# 1.6 PROJECT CONDITIONS

A. Coordinate hardware with other work. Tag each item or package separately, with identification related to the final hardware schedule, and include basic installation instructions in the package. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated and as necessary for proper installation and function. Deliver packaged hardware items to the proper locations for installation.

B. Furnish hardware templates to each fabricator of doors, frames and other work to be factory prepared for the installation of hardware.

# 1.7 WARRANTIES

A. The hardware manufacturers shall provide full replacement warranty as listed below. Replacement warranty shall not include any labor cost.

1.	Surface Closers	25 years.
2.	Locksets etc.	1 year
3.	Exit Devices	3 years
4.	Balance of hardware	1 year

### **PART 2 - PRODUCTS**

### 2.1 MATERIALS AND FABRICATION

- A. Hand of Door: The drawings show the swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of the door swing shown.
- B. Base Metals: Produce hardware units of the basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness but in no case of lesser quality material.
- C. Fasteners: Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not provide hardware, which has been prepared for self-tapping sheet metal screws.
- D. Screws: Furnish screws for installation, with each hardware item. Finish exposed screws to match the hardware finish.
- E. Tools for Maintenance: Furnish a complete set of specialized tools as needed, for the OWNERS continued maintenance, removal and replacement of hardware.
- F. Concealed Fasteners: Provide concealed fasteners for hardware units which are exposed when the door is closed except to the extent no standard manufacturer's units are available with concealed fasteners. Use thru bolts only where necessary to adequately fasten hardware to the door.

# 2.2 HINGES

A. All hinges shall be full mortise five knuckle ball bearing type, template, with non-rising loose pins. Exterior doors and all outswing doors shall have non-removable pins (NRP).

- B. All hinges for 1-3/4" thick doors shall be 4-1/2" wide in the open position. For other thickness doors hinges shall be of a width to permit unobstructed swing of the doors.
- C. Size and weight of hinges shall conform to the following:

```
Up to 36" to 42" ------4-1/2" Standard Weight Over 42" to 48" -----5" Heavy Weight
```

D. Quantity of hinges shall be provided to conform to the following:

```
Doors up to 60" in height ------2 hinges
Doors 60" to 90" in height -----3 hinges
Doors 90" and over -----l hinge every 30" in height
```

E. All hinges shall be the products of one manufacturer, unless otherwise specified.

# 2.3 LOCKSETS, LATCHSETS ETC.

A. Unless otherwise noted, all locksets and latchsets shall be heavy-duty type, function as specified in hardware sets.

# 2.4 KEYS, KEYING, AND CYLINDERS

A. Keys: All keys shall be nickel silver. Furnish a quantity of keys as follows.

1.	Grandmaster Keys	2 each per group
2.	Master Keys	6 each per group
3.	Change Keys	3 each per cylinder
4	C	10

4. Construction Keys 10

- B. Keying: All locks shall be construction keyed and great grand master keyed to the existing Medeco keying system. Key as directed by the OWNER. All master keys shall be hand delivered to the Owner by the manufacturer or his representative.
- C. Cylinders: All cylinders shall have visual key control.

# 2.5 DOOR CLOSING DEVICES

- A. All surface door closers shall meet ANSI A156.4 Grade 1 requirements. Furnish all required brackets, filler plates and any others items required to insure proper installation and operation.
- B. All closers shall be installed so that closer bodies are positioned on room side of doors to and from corridors, i.e., in-swing doors shall be regular arm. Out-swing doors shall have a parallel arm. Regular arm shall be used in connecting doors between rooms.

### **PART 3 - EXECUTION**

### 3.1 GENERAL

- A. Approval: As soon as practical after award of Contract and before a hardware schedule is prepared, and before any hardware is ordered or delivered to the project, the CONTRACTOR shall submit to the ARCHITECT for his written approval, copies of sample list, listing each of the different items of builders hardware and catalog cuts of each item.
- B. Templates: As soon as the hardware schedule is approved the hardware supplier shall furnish to the various fabricators, required templates for fabrication purposes. Templates shall be made available not more than (10) days after receipt of the approved hardware schedule.
- C. Packaging and Marking: All hardware shall be shipped with proper fastenings for secure application. Each package of hardware shall be legibly marked indicating the part of the work for which it is intended. Markings shall correspond with the door tag numbers shown on the approved hardware schedule. Keys shall be tagged within each package set and plainly marked on the face of the envelope with the key control number, door designation and all identification as necessary.
- D. Delivery: Delivery shall be made to the project site to the attention of the GENERAL CONTRACTOR. Where delivery of special hardware is required at any fabricator's plant, the hardware supplier shall make such delivery. Hardware supplier shall furnish a representative to the job site to check in all hardware.

### 3.2 INSTALLATION

- A. Mount hardware units at heights recommended in "Recommended Locations for Builders Hardware" by BHMA, unless otherwise noted or directed by the ARCHITECT.
- B. Install each hardware unit in compliance with the manufacturer's recommendations.

# 3.3 ADJUST AND CLEAN

- A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer. Replace units that cannot be adjusted.
- B. Wherever hardware installation is made more than one (1) month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance make a final check, and adjust all hardware items in such space or area. Adjust door control devices and compensate for final operation of heating and ventilating equipment.

C. Instruct OWNERS personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

# 3.4 HARDWARE SETS

A. The following is a general listing of hardware requirements and is not intended for use as a final hardware schedule. Any items of hardware required by established standards or practices, or to meet state and local codes or proper door operation shall be furnished whether or not specifically called out in the following listed groups.

## B. APPROVED MANUFACTURERS:

Hinges: PBB, Stanley, and McKinney. Exit Devices: Von Duprin (no substitutions). Locksets and Deadlocks: Yale, Best and Dorma.

Cylinders: Medeco (no substitutions) Door Closers: Dorma, LCN and Stanley. Door Stops: Rockwood, Trimco and Ives.

Overhead Stops: Rixson, Dorma and Glynn Johnson.

Seals and Saddles: Zero, NGP and Pemko.

Flush Bolts and Coordinators: Rockwood, Trimco and Ives.

Floor Closers: Dorma and Rixson.

Continuous Hinge

### HARDWARE SET #A

Each to have:

1

1	Electric Exit Device	Von Duprin QELRX98NLOP x US26D
1	Full Height Door Pull	Trimco 1161 x US32D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Concealed Closer	Dorma RTS88 series x Alum
1	Cover Plate	Dorma 8563
1	set Weatherstripping	(by door manufacturer)
1	Door Bottom	Zero 8193A
1	Saddle	Zero (as detailed)
1	Power Transfer	Von Duprin EPT10
1	Power Supply	Von Duprin PS900 series
1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

PBB CG31 -EP

# Operation:

Card reader on non-secure side of door unlocks electric exit device.

Free egress on secure side of door. RX switch in electric exit device shunts alarm.

# HARDWARE SET #A.2

Each to have:

1	Continuous Hinge	PBB CG31
1	Exit Device	Von Duprin 55EO x US26D
1	Concealed Closer	Dorma RTS88 series x Alum
1	Cover Plate	Dorma 8563
1	set Weatherstripping	(by door manufacturer)
1	Door Bottom	Zero 8193A
1	Saddle	Zero (as detailed)

# HARDWARE SET #A.3

Each to have:

1	Continuous Hinge	PBB CG31
1	Exit Device	Von Duprin 55EO x US26D
1	Full Height Door Pull	Trimco 1161 x US32D
1	Concealed Closer	Dorma RTS88 series x Alum
1	Cover Plate	Dorma 8563
1	set Weatherstripping	(by door manufacturer)
1	Door Bottom	Zero 8193A
1	Saddle	Zero (as detailed)

# HARDWARE SET # A.4

Each to have:

1	Continuous Hinge	PBB CG31 - EP
1	Electric Lock	Yale MOCN8891FL x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer/Stop	Dorma 8916-SDS x Alum
1	set Weatherstripping	Zero 429A jambs/head
1	Door Bottom	Zero 355A
1	Saddle	Zero (as detailed)
1	Power Transfer	Von Duprin EPT10
1	Power Supply	(by security vendor)
1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

# Operation:

Card reader on non-secure side of door unlocks electric lock.

Free egress on secure side of door. RX switch in electric lock shunts alarm.

# HARDWARE SET # A.5

Each to have:

1	Continuous Hinge	PBB CG31
1	Exit Device	Von Duprin 9875L-Latitude x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer/Stop	Dorma 8916-SDS x Alum
1	set Weatherstripping	Zero 429A jambs/head
1	Door Bottom	Zero 355A
1	Saddle	Zero (as detailed)

# HARDWARE SET # B

Each to have:

1	Floor Closers	Dorma BTS80 series x US26D
1	Exit Device	Blumcraft H100-D x US32D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D

# HARDWARE SET #C.1

Each to have:

2	Continuous Hinge	PBB CG31-EP
2	set Full Height Door Pull	Trimco 1161 BTB x US32D
2	Concealed Closer	Dorma RTS88 series x Alum
2	Cover Plate	Dorma 8563
2	Saddle	Zero (as detailed)

# HARDWARE SET #C.2

2	Continuous Hinge	PBB CG31-EP
2	Exit Devices	Von Duprin QELRX9847EO x US26D
2	Full Height Door Pull	Trimco 1161 x US32D
2	Concealed Closer	Dorma RTS88 series x Alum
2	Cover Plate	Dorma 8563
1	set Weatherstripping	(by door manufacturer)
2	Door Bottom	Zero 8193A
1	Saddle	Zero (as detailed)
1	Power Transfer	Von Duprin EPT10
2	Power Supply	Von Duprin PS900 series

2 Door Contact (by security vendor)

### Operation:

Electric exit devices are electric locked and unlocked by the security system. Free egress on secure side of door. RX switch in electric exit device shunts alarm.

# HARDWARE SET #D.1

Each to have:

1	Continuous Hinge	PBB CG31-EP
1	set Full Height Door Pull	Trimco 1161 BTB x US32D

Concealed Automatic Op. Stanley Magic Force x Alum
 Saddle Zero (as detailed)
 Wall Actuator Deltrex USA F106-E24

### HARDWARE SET #D.2

Each to have:

1	Continuous Hinge	PBB CG31-EP
1	Electric Exit Device	Von Duprin QELRX98NLOP x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Full Height Door Pull	Trimco 1161 x US32D
1	Concealed Automatic Op.	Stanley Magic Force x Alum
1	set Weatherstripping	(by door manufacturer)
1	Door Bottom	Zero 8193A
1	Saddle	Zero (as detailed)
2	Wall Actuators	Deltrex USA F106-E24
1	Power Transfer	Von Duprin EPT10
1	Power Supply	Von Duprin PS900 series
1	Door Contact	(by security vendor)
1	Card Reader	(by security vendor)

### Operation:

Card reader on non-secure side of door unlocks electric exit device and outside wall actuator, which signals automatic operator to open door.

Free egress on secure side of door. RX switch in electric exit device shunts alarm. When electric exit devices are locked, inside wall actuator unlocks electric exit devices and signals automatic operator to open doors. When electric exit devices are unlocked, inside wall actuator signals automatic operator to open door.

HARDWARE SET # E

2	Floor Closers	Dorma BTS80 series x US26D
2	Exit Devices	Blumcraft H100-D x US32D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D

# HARDWARE SET # F

Each to have:

1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D

Note: The door manufacturer will furnish all hardware.

## HARDWARE SET #G

Each to have:

4	Pocket Pivots	Dorma 75523 x
2	Exit Device	Von Duprin 9457L-F-BE x 02
2	Concealed Closers	Dorma ITS96 series
2	Magnetic Holders	TBD
1	set Smoke Seals	Zero 188S-BK jambs/head
1	set Astragal Seals	Zero 326 x 326

Note: Finish of all hardware to be Tiger Drylac RAL 7035.

Operation: Doors are held open electrically. When signaled from the fire alarm system or loss of power, doors close automatically.

# HARDWARE SET # H

	Hinges	PBB (see description) x US26D
1	Electric Lock	Yale MOCN8891FL x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer	Dorma 8616-AF-FC x Alum
1	Stop	Trimco W1211 x US32D
1	set Seals	Zero 870A jambs/head
1	Door Bottom	Zero 367A
1	Saddle	Zero (as detailed)
1	Power Transfer	Von Duprin EPT10
1	Power Supply	(by security vendor)
1	Door Contact	(by security vendor)

1 Card Reader (by security vendor)

## Operation:

Card reader on non-secure side of door unlocks electric lock.

Free egress on secure side of door. RX switch in electric lock shunts alarm.

# HARDWARE SET # K

Each to have:

	Hinges	PBB (see description) x US26D
1	Privacy Set	Yale MO5402LN x US26D
1	Closer/Stop	Dorma 8616-DS-FC x Alum
3	Silencers	Trimco 1229A

# HARDWARE SET # J.1

Each to have:

	Hinges	PBB (see description) x US26D
1	Storeroom Lock	Yale MO5405LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Door Stop	Trimco W1211 x US32D
1	set Smoke Seals	Zero 188S-BK jambs/head
1	set Astragal Seals	Zero 326A x 326A

# HARDWARE SET #J.2

Each to have:

	Hinges	PBB (see description) x US26D
2	Flush Bolts	Trimco W3917 x US26D
1	Dustproof Strike	Trimco 3910 x US32D
1	Storeroom Lock	Yale MO5405LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
2	Overhead Stop	Dorma 900S series x US26D
1	set Smoke Seals	Zero 188S-BK jambs/head
1	set Astragal Seals	Zero 326A x 326A

# HARDWARE SET # J.3

	Hinges	PBB (see description) x US26D
1	Storeroom Lock	Yale MO5405LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D

1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Overhead Stop	Dorma 900S series x US26D
1	set Smoke Seals	Zero 188S-BK jambs/head

## HARDWARE SET # J.4

Each to have:

	Hinges	PBB (see description) x US26D
1	Storeroom Lock	Yale MO5405LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer/Stop	Dorma 8616-IS-FC x Alum
3	Silencers	Trimco 1229A

# HARDWARE SET # L

Each to have:

	Hinges	PBB (see description) x US26D
1	Deadlock	Yale 315 x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	set Dummy Trim	Yale MO455LN x US26D
1	Closer/Stop	Dorma 8616-DS-FC x 689
3	Silencers	Trimco 1229A

## HARDWARE SET # L.1

Each to have:

Hinges	PBB (see description) x US26D
Deadlock	Yale 315 x US26D
Master Keyed Cylinder	Medeco (to suit) x US26D
Temporary Core	Medeco (to suit) x US26D
Permanent Core	Medeco (to suit) x US26D
set Dummy Trim	Yale MO455LN x US26D
Closer	Dorma 8616-AF-FC series x 689
Silencers	Trimco 1229A
	Deadlock Master Keyed Cylinder Temporary Core Permanent Core set Dummy Trim Closer

# HARDWARE SET # M

	Hinges	PBB (see description) x US26D
1	Office Lock	Yale MO5404LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D

1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Door Stop	Trimco W1211 x US32D
_		TT : 1000 t

3 Silencers Trimco 1229A

### HARDWARE SET #N

Each to have:

4 Pocket Pivots Dorma 755	23
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1 Exit Device Von Duprin 9475L-F-BE x 02

1 Concealed Closers Dorma ITS96 series

1 Magnetic Holder TBD

1 set Smoke Seals Zero 188S-BK jambs/head

Note: Finish of all hardware to be Tiger Drylac RAL 7035.

Operation: Doors are held open electrically. When signaled from the fire alarm system or loss of power, doors close automatically.

# HARDWARE SET #P.1

Each to have:

	Hinges	(by frame manufacturer)
2	Flush Bolts	Trimco W3917 x US26D
1	Dustproof Strike	Trimco 3910 x US32D
1	Storeroom Lock	Yale MO5405LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Overhead Stop	Dorma 900S series x US26D

# HARDWARE SET #P.2

Each to have:

	Hinges	PBB (see description) x US26D
2	Self Latch Flush Bolts	Trimco 3810 x 3820 x US26D
1	Dustproof Strike	Trimco 3910 x US32D
1	Classroom Lock	Yale MO5408LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer/Stop	Dorma 8616-DS-FC x Alum
2	Silencers	Trimco 1229A

HARDWARE SET #P.3

	Hinges	PBB (see description) x US26D
1	Deadlock	Yale 315 x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Push Plate	Trimco 1001-3 x US32D
1	Pull Bar	Trimco 1195-3 x US32D
1	Closer/Stop/HO	Dorma 8616-DST-FC x Alum
2	Silencers	Trimco 1229A

# HARDWARE SET #Q

Each to have:

	Hinges	(by frame manufacturer)
1	Storeroom Lock	Yale MO5405LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Door Stop	Trimco W1211 x US32D

# HARDWARE SET #R

Each to have:

	Hinges	PBB (see description) x US26D
2	Self Latch Flush Bolts	Trimco 3810 x 3820 x US26D
1	Dustproof Strike	Trimco 3910 x US32D
1	Classroom Lock	Yale MO5408LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
2	Closer/Stop	Dorma 8616-DS-FC x Alum
1	Coordinator	Trimco 3094 series
1	set Seals	Zero 326A jambs/head
1	set Astragal Seals	Zero 55/555
2	Door Bottoms	Zero 367A

# HARDWARE SET #S

	Hinges	PBB (see description) x US26D
2	Exit Devices	Von Duprin 5547L-F x Latitude x US26D
1	set Dummy Trim	Yale MO455LN x US26D
2	Closer/Stop	Dorma 8616-DS-FC x Alum
1	set Seals	Zero 326A jambs/head
1	set Astragal Seals	Zero 55/555

2 Door Bottoms Zero 367A

HARDWARE SET #T

Each to have:

Hinges PBB (see description) x US26D
2 set Dummy Trim Yale MO455LN x US26D
2 Push Plates Trimco 1001-3 x US32D
2 Closer/Stop Dorma 8616-DS-FC x Alum
1 set Seals Zero 326A jambs/head

set Astragal Seals
 Door Bottoms
 Zero 55/555
 Zero 367A

## HARDWARE SET #U

Each to have:

	Hinges	PBB (see description) x US26D
2	Exit Devices	Von Duprin 5547L x Latitude x US26D
2	Master Keyed Cylinder	Medeco (to suit) x US26D
2	Temporary Core	Medeco (to suit) x US26D
2	Permanent Core	Medeco (to suit) x US26D
2	Closer/Stop	Dorma 8616-IS-FC x Alum
1	set Seals	Zero 326A jambs/head
1	set Astragal Seals	Zero 55/555
2	Door Bottoms	Zero 367A

# HARDWARE SET #V

Each to have:

Hinges PBB (see description) x US26D

1 Exit Device Von Duprin 5575L-BE x Latitude x US26D

1 Closer/Stop Dorma 8616-IS-FC x Alum 1 set Seals Zero 326A jambs/head

1 Door Bottom Zero 367A

## HARDWARE SET #V.1

Each to have:

Hinges PBB (see description) x US26D

1 Exit Device Von Duprin 5575L-BE x Latitude x US26D

1 Closer Dorma 8616-AF-FC series x Alum

1 Stop Trimco W1211 x US32D 1 set Seals Zero 326A jambs/head

1 Door Bottom Zero 367A

# HARDWARE SET #W

Each to have:

	Hinges	PBB (see description) x US26D
1	Storeroom Lock	Yale MO5405LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer/Stop	Dorma 8616-DS-FC x Alum
1	Closer Mtg. Bracket	Zero 870SPB
1	set Seals	Zero 870A jambs/head

1 Door Bottom Zero 365A

# HARDWARE SET #X

Each to have:

	Hinges	PBB (see description) x US26D
1	Exit Device	Von Duprin 5575L-F x Latitude x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer	Dorma 8616-AF-FC series x Alum
1	Door Stop	Trimco W1211 x US32D
1	set Seals	Zero 326A jambs/head
1	Door Bottom	Zero 367A

# HARDWARE SET #X.1

Each to have:

	Hinges	PBB (see description) x US26D
1	Exit Device	Von Duprin 5575L x Latitude x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer/Stop	Dorma 8616-DS-FC series x Alum
1	set Seals	Zero 326A jambs/head
1	Door Bottom	Zero 367A

# HARDWARE SET # Y

	Hinges	PBB (see description) x US26D
1	Classroom Lock	Yale MO5408LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D

1	Permanent Core	Medeco (to suit) x US26D
1	Closer	Dorma 8616-AF-FC series x 689
1	Stop	Trimco W1211 x US26D
1	set Smoke Seals	Zero 188S-BK jambs/head

## HARDWARE SET # Y.1

Each to have:

	Hinges	PBB (see description) x US26D
1	Classroom Lock	Yale MO5408LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer/Stop	Dorma 8616-IS-FC x 689
1	set Smoke Seals	Zero 188S-BK jambs/head

# HARDWARE SET # Y.2

Each to have:

	Hinges	PBB (see description) x US26D
1	Classroom Lock	Yale MO5408LN x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
1	Closer	Dorma 8616-AF-FC series x 689
1	Stop	Trimco W1211 x US26D
1	set Seals	Zero 326A jambs/head
1	Door Bottom	Zero 367A

# HARDWARE SET # Z

Each to have:

	Hinges	PBB (see description) x US26D
1	set Dummy Trim	Yale MO455LN x US26D
1	Closer	Dorma 8616-AF-FC series x 689
3	Silencers	Trimco 1229A

# HARDWARE SET # Z.1

	Hinges	PBB (see description) x US26D
1	set Dummy Trim	Yale MO455LN x US26D
1	Closer	Dorma 8616-AF-FC series x 689
1	Stop	Trimco W1211 x US26D
1	set Seals	Zero 326A jambs/head
1	Door Bottom	Zero 367A

# HARDWARE SET # Z.2

Each to have:

	Hinges	PBB (see description) x US26D
2	Flush Bolts	Trimco W3917 x US26D
1	Dustproof Strike	Trimco 3910 x US32D
1	Deadlock	Yale 315 x US26D
1	Master Keyed Cylinder	Medeco (to suit) x US26D
1	Temporary Core	Medeco (to suit) x US26D
1	Permanent Core	Medeco (to suit) x US26D
2	set Dummy Trim	Yale MO455LN x US26D
2	Closer/Stop	Dorma 8616-DS-FC series x 689
2	Silencers	Trimco 1229A

Trimco 1229A Silencers

**END OF SECTION** 

#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the glass and glazing as shown on the drawings and/or specified herein, including, but not limited to, glazing of the following:
  - 1. Windows.

- 2. Doors.
- 3. Curtain walls.
- 4. Entrances.
- 5. Storefront framing.
- 6. Interior borrowed lites.
- 7. Interior frameless mirrors.
- 8. Interior glazed wall systems.
- 9. Interior guardrails.
- 10. Projection room windows.

### 1.3 RELATED SECTIONS

- A. Ornamental Metal Stairs -- Section 05700
- B. Ornamental Glass Rail System -- Section 057313
- C. Steel Doors and Frames Section 081113.
- D. Aluminum Entrances and Storefronts Section 084113.
- E. All Glass Doors -- Section 084228
- F. Glazed Aluminum Curtain Walls Section 084413.
- G. Framed bathroom mirrors Section 102813.
- H. Glazed Metal Partition System Section 102219
- I. Folding Glass Panel Partition Section 102239

### 1.4 REFERENCES

- A. Comply with the recommendations of the following references unless more stringent requirements are indicated herein.
  - 1. FGMA Publications: FGMA Glazing Manual.
  - 2. LSGA Publications: LSGA Design Guide.
  - 3. SIGMA Publications: TM-3000 Vertical Glazing Guidelines.

- 4. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR Part 1201, Safety Standards for Architectural Glazing, Sealed Insulating Glass Manufacturing Association.
- 5. Fire-Resistive Glazing Products for Door Assemblies: Products identical to those tested per ASTM E 152, labeled and listed by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.
- 6. ASTM C 920, Elastomeric Joint Sealant.
- 7. Insulating Glass Criteria: IGCC International Glass Certification Council.

### 1.5 PERFORMANCE REQUIREMENTS

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.
- B. Glass Design: Glass thicknesses indicated on drawings and/or specified herein are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
  - Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements Per FM Global Data Sheet 1-28 Wind Design:
  - 2. Student Center Addition
    - a. Field (Zone 4): Inward 44.8 psf, Outward 47.6 psf.
    - b. Corners (Zone 5): Inward 44.8 psf, Outward 55.9 psf.
  - 3. Theater Building
    - a. Field (Zone 4): Inward 40.0 psf. Outward 42.5 psf.
    - b. Corners (Zone 5): Inward 40.0 psf, Outward 49.9 psf.
  - 4. A safety factor of 2.0 should be applied to the inward and outward design pressures obtained from DataSheet 1-28. The pressures listed in the table are the base design pressures and are not intended asultimate design pressures (with safety factor applied).
  - 5. Probability of Breakage for Vertical Glazing:

- a. 8 lites per 1000 for lites set vertically or not more than 15 degrees off vertical and under wind action.
- b. 1 lite per 1000 for lites installed 15 degrees from the vertical and under wind action.
- c. Load Duration: 60 seconds or less.
- 6. Maximum Lateral Deflection: For glass supported on all four edges, provide thickness required that limits center deflection at design wind pressure to 1/100 times the short side length or 1/2", whichever is less.
- 7. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
  - a. Temperature Change (Range): 120 deg. F ambient; 180 deg F, material surfaces.
- 8. Thermal Solar Performance: See Article 2.2 herein.
- C. Glass units shall be annealed, heat strengthened, fully tempered or laminated where required to meet wind load and safety glazing requirements, as shown, specified, or recommended by the glass fabricator, and as required by the prevailing Building Code.

#### 1.6 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that materials and systems comply with specified requirements, including performance requirements.
- B. Submit compatibility and adhesion test reports from sealant manufacturer indicating materials were tested for compatibility and adhesion with glazing sealant, as well as other glazing materials including insulation units.
- C. Initial Selection Samples: Submit samples of each glass and glazing material showing complete range of colors, textures, and finishes available for each material used.
  - 1. Submit complete range of samples of standard colors and patterns for ceramic frits at insulating glass.
  - 2. Submit complete range of samples of sandblasted glass showing variations of grits and opacity achieved.
- D. Verification Samples: Submit representative samples of each glass and glazing material that is to be exposed in completed work. Show full color ranges and finish

- variations expected. Provide glass samples having minimum size of 144 sq. in. and 6 in. long samples of sealants and glazing materials; all samples shall bear the name of the manufacturer, brand name, thickness, and quality.
- E. Calculations: Provide wind load charts, calculations, thermal stress analysis, and certification of performance of this work. Indicate how design requirements for loading and other performance criteria have been satisfied. Document shall be signed and sealed by a Professional Engineer licensed in the State of Connecticut.
- F. Test Reports: Provide certified reports for specified tests.
- G. Warranties: Provide written warranties as specified herein.

### 1.7 QUALITY ASSURANCE

- A. Source: For each glass and glazing type required for work of this Section, provide primary materials which are products of one manufacturer. Provide secondary or accessory materials which are acceptable to manufacturers of primary materials.
- B. Installer: A firm with a minimum of five years' experience in type of work required by this Section and which is acceptable to manufacturers of primary materials; and with a successful record of in-service installations similar in size and scope to this Project.
- C. Glass Thickness: Glass thicknesses shown on drawings and/or specified herein are minimum thicknesses. Determine and provide size and thickness of glass products that are certified to meet or exceed performance requirements specified in this Section.
- D. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated.
  - 1. GANA Publications: GANA's "Glazing Manual" and "Laminated Glass Design Guide."
  - 2. IGMA Publications: IGMA TM-3000, "Vertical Glazing Guidelines for Sealed Insulating Glass Units."
- E. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.
- F. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201.
  - Subject to compliance with requirements, obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council.

- 2. Where glazing units, including Kind FT glass and laminated glass, are specified in Part 2 articles for glazing lites more than 9 sq. ft. in exposed surface area of one side, provide glazing products that comply with Category II materials, for lites 9 sq. ft. or less in exposed surface area of one side, provide glazing products that comply with Category I or II materials, except for hazardous locations where Category II materials are required by 16 CFR 1201 and regulations of authorities having jurisdiction.
- G. Insulating Glass Certification Program: Permanently marked on spacers with appropriate certification label of the following testing and inspecting agency:
  - Insulating Glass Certification Council.
  - 2. Associated Laboratories, Inc.
  - 3. Insulating Glass Manufacturers Alliance.
- H. Manufacturer shall be ISO 9001-2000 Certified.

### 1.8 TESTS

- A. Preconstruction Sealant Test: Submit samples of materials to be used to glazing sealant manufacturer to determine sealant compatibility. Include samples of glass, gaskets, glazing materials, framing members, and other components and accessories of glazing work. Test in accordance with ASTM C 794 to verify what type of primers (if any) are required to ensure sealant adhesion to substrates.
  - 1. Submit minimum of nine pieces of each type and finish of framing member, and nine pieces of each type, class, kind, condition, and form of glass, including monolithic, laminated, and insulating glass for adhesion tests.
  - 2. Provide manufacturer's written report and recommendations regarding proper installation.

## 1.9 PROJECT CONDITIONS

- A. Weather: Perform work of this Section only when existing or forecasted weather conditions are within limits established by manufacturers of materials and products used.
- B. Temperature Limits: Install sealants only when temperatures are within limits recommended by sealant manufacturer, except, never install sealants when temperatures are below 40 deg. F.

## 1.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened, factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations and GANA Manual.
  - Protect materials from moisture, sunlight, excess heat, sparks and flame.
  - 2. Sequence deliveries to avoid delays, but minimize on-site storage.

#### 1.11 WARRANTIES

- A. General: Warranties shall be in addition to, and not a limitation of, other rights the Owner may have under the Contract Documents.
- B. Manufacturer's Special Project Warranty on Coated Glass Products: Provide written warranty signed by manufacturer of coated glass agreeing to furnish f.o.b. point of manufacture, within specified warranty period indicated below, replacements for those coated glass units which develop manufacturing defects. Manufacturing defects are defined as peeling, cracking or deterioration in metallic coating due to normal conditions and not due to handling or installation or cleaning practices contrary to glass manufacturer's published instructions.
  - Warranty Period: Manufacturer's standard but not less than five (5) years after date of substantial completion.
- C. Manufacturer's Special Project Warranty on Insulating Glass: Provide written warranty signed by manufacturer of insulating glass agreeing to furnish f.o.b. point of manufacture, freight allowed project site, within specified warranty period indicated below, replacements for those insulating glass units developing manufacturing defects. Manufacturing defects are defined as failure or hermetic seal of air space (beyond that due to glass breakage) as evidenced by intrusion of dirt or moisture, internal condensation or fogging, deterioration of protected internal glass coatings, if any, and other visual indications of seal failure or performance; provided the manufacturer's instructions for handling, installing, protecting and maintaining units have been complied with during the warranty period.
  - 1. Warranty Period: Manufacturer's standard but not less than ten (10) years after date of substantial completion.
- D. Manufacturer's Special Project Warranty on Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.

1. Warranty period ten (10) years from date of Substantial Completion.

#### PART 2 PRODUCTS

# 2.1 ACCEPTABLE MANUFACTURERS/FABRICATORS

- A. All glass and glazing used at the exterior of the Project shall be manufactured by the same manufacturer. The same manufacturer and the same furnace shall be used for all tempered and heat strengthened glass used throughout the project. Acceptable manufacturers include, but are not limited to, the following:
  - PPG Industries.
  - Guardian Industries.
  - 3. Pilkington.
  - 4. AFG.
  - 5. JE Berkowitz, LP.
  - 6. Viracon.
  - 7. Schott Glass Company.

## 2.2 GLASS MATERIALS AND PRODUCTS

- A. Ultra-Clear (Low-Iron) Glass: Class I (clear); with a minimum 91 percent visible light transmission and a minimum solar heat gain coefficient of 0.87.
  - Low Iron Tempered Glass: Basis of Design provide "Starphire" (basis of design) by PPG, or OptiWhite by Viracon, Ultra White by Guardian tempered in accordance ASTM C 1048, thicknesses as indicated.
- B. Ultra-Clear (Low Iron) Clear Float Glass: ASTM C 1036, Type I (transparent, flat), Class 1 (clear), Quality q3, with a minimum 91 percent visible light transmission and a minimum solar heat gain coefficient of 0.87.
  - Low Iron Float Glass: Basis of Design provide "Starphire" (basis of design) by PPG, or OptiWhite by Viracon, Ultra White by Guardian float in accordance ASTM C 1036, thicknesses as indicated.
- C. Clear Float Glass: ASTM C 1036, Type I (transparent, flat), Class 1 (clear), Quality q3, minimum 1/4" thick.
- D. Clear Tempered Glass: ASTM C 1048, Condition A (uncoated), Type I (transparent, flat), Class 1 (clear), Quality q3, Kind FT, minimum 1/4" thick. Tempered glass must be certified by SGCC to meet applicable standards.

- 1. Performance Requirements for Tempered Glass
  - a. Length and Width: For 2.9 mm to 6.0 mm; +/-1.6 mm.
  - b. Diagonal: +/- 3.0 mm.
  - c. Edgework: Belt seaming or diamond wheels. 1.5 mm seam of upper and lower glass edges. No sharp edges.
  - d. Corners: No more than 3.0 mm from square.
  - e. Float Glass Defects: Must meet the requirements of ASTM C 1036. The most common defects are scratches, stones gaseous bubbles and edge chips. Tables in the glass standards have limits for size/quantity of defects.
  - f. Tempered glass shall have a minimum surface compression of 10,000 psi.
  - g. Tempered glass to be heat-treated by horizontal (roller hearth) process with inherent roller-wave distortion parallel to the bottom edge of the glass when installed.
  - h. Flatness Tolerances
    - 1). Roller-Wave or Ripple: The deviation from flatness at any peak shall be targeted not exceed 0.003" as measured per peak to valley for ¼" (6mm) thick glass.
    - 2). Bow and Warp: The bow and warp tolerances shall not exceed 1/32" per linear foot.
    - 3). Fully tempered glass shall be heat soaked to EN 14179-1:2005-European Heat Soaking Standard.
- E. Laminated Safety Glass: Provide two glass panes of equal thickness, laminated together with a polyvinyl butyl interlayer, conforming to ASTM C 1172 and as follows:
  - 1. Interlayer Color: Clear and translucent privacy.
    - a. Interlayer Material: Provide Eastman Chemical "Vanceva Saflex," 0.030" thick at vertical applications, and 0.060" thick at sloped or horizontal applications. Basis of design is Vanceva Saflex unless otherwise noted. Subject to compliance with requirements specified other acceptable manufacturers are Bendheim Glass and Viridian Spectra Prism.
  - 2. Minimum thickness of 1/4".
- F. Patterned Glass: Provide ceramic frit patterned glass in custom colors and patterns as selected by the Architect, minimum thickness of 1/4". Ceramic frit glass shall meet requirements specified herein for ceramic frit spandrel glass.
- G. Ceramic Frit Spandrel Glass:
  - Heat-treated glass with ceramic coating complying with ASTM C 1048, Condition B (spandrel glass, one surface ceramic-coated) Type 1 (Transparent, Flat), Quality Q3 (Glazing Select), with other requirements as specified.

- 2. GANA/GTA 66-9-20, Specification for Heat-Strengthened or Fully Tempered Ceramic Enamel Spandrel Glass Used for Building Window/Curtain Walls.
- 3. Custom color selected by the Architect.
- H. Insulating Glass: Insulating glass unit shall consist of 1/4" clear exterior lite of float (or tempered, low iron, where required) glass with Low E coating on No. 2 face, 1/2" interspace and 1/4" clear interior lite of float (or tempered, low iron, where required) glass. Provide factory assembled units of organically sealed panes of glass enclosing a hermetically sealed dehydrated air space, complying with ASTM E 2190, and as follows:
  - 1. Basis of Design: Viracon Low Iron VE13-2M (basis of design) or PPG or Guardian meeting performance requirements.
  - 2. Sealing System: Dual seal.
  - 3. Primary Sealant: Polyisobutylene.
  - 4. Secondary Sealant: Silicone, General Electric IGS 3204 or IGS 3100, or Dow Corning 982.
    - a. For structurally glazed IG units, secondary seal shall conform to ASTM C 1249.
    - b. Primary and secondary seals shall not contain voids and must be continuously bonded to the glass structure.
  - 5. Spacer: Stainless steel with welded, soldered, or bent corners, hollow tube types, filled with low nitrogen absorption desiccant.
  - 6. Desiccant: Molecular sieve, silica gel, or blend of both.
  - 7. Interspace Content: Argon.
  - 8. Glass Thickness: 1/4" minimum.
  - Low 'E' Coating: Provide high-performance, clear, metallic coating, VE1-2M as manufactured by Viracon (basis of design), PPG or Guardinan. Provide Low 'E' coating which has the following performance characteristics when applied to the No. 2 surface of 1" insulating units, both lites 1/4" clear:
    - a. Visible Light Transmittance: 70%.
    - b. Solar Energy Transmittance: 33%.
    - c. Solar Heat Gain Coefficient (SHGC): 0.38.
    - d. U-Value: 0.29 winter, 0.26 summer.

- 10. Units shall be certified for compliance with seal classification "CBA" by the Insulating Glass Certification Council (IGCC) or by IGMA, and tested in accordance with the above ASTM Test Methods.
- 11. Insulating glass shall conform to the following tolerances:
  - a. Length and Width: + 3.0 mm/ -2.0 mm.
  - b. Diagonal: +/- 3.0 mm.
  - c. Thickness: As agreed +/- 1.0 mm.
  - d. Edge-Deletion of Coating: Minimum 8 mm wide. Width of deletion must be more than the width of the secondary seal. Silver layer(s) must be completely removed. Appearance must be uniform.
  - e. Primary PIB Seal: Must be complete with no breaks. Appearance must be uniform. PIB bead must overlap coating. No visible bright line when glass is viewed in transmission. The width of the PIB bead shall be 4.0 mm + 3.0/ 1.5 mm
  - f. Secondary Seal: Nominal 6 mm + 3.0/ 1.5 mm. The minimum width of the secondary silicone seal for IG units that are glazed structurally must be determined according to ASTM C 1249. The secondary seal must be uniformly applied without bubbles, cavities or gaps. Avoid excess sealant that will need to be trimmed off later.
- 12. Additional requirements and properties for primary and secondary insulating glass seals and spacers:
  - a. All glass units shall comply with IGMA Guidelines which limits the dimension of the visible edge seal encroachment into the vision area to be no greater than the sightline infringement of 3mm (0.12").
  - b. Insulating glass unit hermetic seal to consist of butyl primary and silicone secondary seals with bent, welded, or soldered interpane spacer corners; keyed corners are not acceptable unless also soldered or welded. Spacers shall be aluminum or stainless steel. Locate spacer joint at the top or sides of the units, but in no instances at the sill. Design units to minimize the number of spacer joints. Provide solid keys, embedded in butyl sealant on all four sides, at spacer joints.
  - c. Hermetic seals must be continuous and intimately bonded to both lites of glass. Provide primary seal of uniform depth with a nominal width of 1/8" to 3/16". Hermetic seals shall not be contaminated with debris, fingerprints, or other foreign matter and shall not contain voids or air pockets that decrease the width of the seal below the minimum widths listed in these Specifications, or that breach the seal. The width of the primary seal shall not be less than 1/16", and the total cumulative length of the primary seal between 1/16" and 1/8" shall be less than 12" in any one insulating glass unit. The primary seal shall not have a reduced thickness at the corners. An increased thickness of the primary seal at the corners is acceptable.

- d. Provide secondary seal of uniform depth with a nominal width of ¼". Provide a total width of the primary and secondary seal of ½". Units shall carry CBA rating as established by ASTM E 774 and shall meet SIGMA 65-7-2, latest edition. Units shall not contain breather or capillary tubes or similar penetrations.
- I. Fire-Rated Glazing Material: Proprietary product in the form of clear flat sheets of 3/16" nominal thickness weighing 2.5 lb./sq. ft., and as follows:
  - 1. Fire Protection Rating: As required by Code for the fire rated opening in which glazing material is installed, and permanently labeled by a testing and inspecting agency acceptable to authorities having jurisdiction.
  - 2. Product: "Premium FireLite" by Nippon Electric Glass Co., Ltd., and distributed by Technical Glass Products (basis of design) or Saint Gobain, Interedge Technologies.
- J. Frameless Mirrors: 1/4", Quality q2, clear float glass with silver, copper, and organic coating, edges uniformly ground and polished.
- K. Projection Room Glazing Basis of Design: Schott Glass "Amiran," 3/8" thick, antireflective low iron glass.
- L. Additional Interior Glass
  - 1. Clear, tempered, low-iron.
  - 2. Clear, tempered. laminated low-iron.
  - 3. Multiply treads shall have a sacrificial top layer with slip-resistant surface. Basis of Design glass is Walker Glass with Walker Textures Pattern 406 top layer. Subject to compliance with requirements specified, other acceptable manufacturers are McGrory Glass Madras Flooring or Jockimo (Glass Grit top layer)

## 2.3 GLAZING MATERIALS AND PRODUCTS

- A. General: Provide sealants and gaskets with performance characteristics suitable for applications indicated. Ensure compatibility of glazing sealants with insulating glass sealants, with laminated glass interlayers, and with any other surfaces in contact.
- B. General Glazing and Cap Bead Sealant: Provide sealant with maximum Shore A hardness of 50. Provide one of the following:
  - 1. Dow Corning 795.
  - 2. General Electric Silglaze N 2500 or Contractors SCS-1000.
  - 3. Tremco Spectrem 2.

- C. Weather Seal Sealant: Provide non-acid curing sealant with movement range <u>+</u> 50%, ASTM C 719. Provide one of the following:
  - 1. Dow Corning 795.
  - 2. General Electric Silpruf.
  - 3. Tremco Spectrem 2.
- D. Backer Rod: Closed cell non-gassing polyethylene rod with rod diameter 25% wider than joint width.
- E. Dense Elastomeric Compression Seal Gaskets: Provide molded or extruded neoprene or EPDM gaskets, Shore A hardness of 75±5 for hollow profile, and 60±5 for solid profiles, ASTM C 864.
- F. Cellular, Elastomeric Preformed Gaskets: Provide extruded or molded closed cell, integral-skinned neoprene, Shore A 40±5, and 20% to 35% compression, ASTM C 509; Type II.
- G. Preformed Glazing Tape: Provide solvent-free butyl-polyisobutylene rubber with 100% solids content complying with ASTM C 1281 AAMA A 800 with integral continuous EPDM shim. Provide preformed glazing tape in extruded tape form. Provide Tremco "Polyshim II" or subject to compliance with requirements, products by 3M or Norton.
- H. Setting Blocks: Provide 100% silicone blocks with Shore A hardness of 80-90. Provide products certified by manufacturer to be compatible with silicone sealants. Length to be not less than 4". Width for setting blocks to be 1/16" more than glass thickness and high enough to provide the lite recommended by glass manufacturer. When thickness of setting block exceeds 3/4" the glass manufacturer must be consulted for sizes and configuration. In a vented system, setting block shall be designed so as to not restrict the flow of water within the glazing rabbet to the weep holes.
  - 1. Shims: For shims used with setting blocks, provide same materials, hardness, length and width as setting blocks.
  - 2. Structural Silicone Glazing: Provide silicone setting blocks where structural silicone occurs at sills and at insulating units with silicone edge seals.
- I. Edge Blocks: Provide neoprene or silicone as required for compatibility with glazing sealants. Provide blocks with Shore A hardness of 55±5.
- J. Spacers: Elastomeric blocks or continuous extrusions with a Shore A durometer hardness required by glass manufacturer to maintain glass lites in place.
- K. Miscellaneous Glazing Materials: Provide sealant backer rods, primers, cleaners, and sealers of type recommended by glass and sealant manufacturers.

- L. Mirror Adhesive: Palmer's "Mirro-Mastic," or subject to compliane with requirements, products manufacturer by PPG or Gunther. Mastic must be compatible with mirror backing.
  - 1. Clips: No. 4 finish Type 304 stainless steel.

## 2.4 FABRICATION OF GLASS AND OTHER GLAZING PRODUCTS

- A. Fabricate glass and other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing standard, to comply with system performance requirements.
- B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites in a manner that produces square edges with slight kerfs at junctions with indoor and outdoor faces.
- C. Grind smooth and polish exposed glass edges.

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Examine framing glazing, with Installer present, for compliance with the following:
  - 1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
  - 2. Presence and functioning of weep system.
  - 3. Minimum required face or edge clearances.
  - 4. Effective sealing between joints of glass-framing members.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

#### 3.3 GENERAL GLAZING STANDARDS

- A. Install products using the recommendations from the manufacturer of glass, sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those in the GANA "Glazing Manual."
- B. Verify that Insulating Glass Unit (IGU) secondary seal is compatible with glazing sealants.

- C. Install glass in prepared glazing channels and other framing members.
- D. Install setting blocks in rabbets as recommended by referenced glazing standards in GANA's "Glazing Manual" and IGMA's "Glazing Guidelines."
- E. Provide bite on glass, minimum edge and face clearances and glazing material tolerances recommended by GANA's "Glazing Manual."
- F. Provide weep system as recommended by GANA's "Glazing Manual."
- G. Set glass lites in each series with uniform pattern, draw, bow and similar characteristics.
- H. Distribute the weight of glass unit along the edge rather than the corner.
- Comply with manufacturers and referenced industry standards on expansion joint and anchors; accommodating thermal movement; glass openings; use of setting blocks, edge, face, and bite clearances; use of glass spacers; edge blocks and installation of weep systems.
- J. Protect glass edge damage during handling and installation.
- K. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing or plaster.
- L. Remove and replace glass that is broken, chipped cracked or damaged in any way.

## 3.4 GLAZING

- A. Glazing channel dimensions, as indicated on Shop Drawings, provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by Project conditions during installation.
- B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.
- C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction sealant-substrate testing.
- D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead. Install setting blocks at the one greater points of each lite along the horizontal mullion.
- E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

- F. Provide spacers for glass lites where the length plus width is larger than 50 inches as follows:
  - Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
  - 2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
- G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.
- H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
- I. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.
- J. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

# K. Flush Glazing

- 1. If the butt joint in the metal framing is in the vertical direction, the glazier shall run the tape initially on the head and sill members going directly over this joint. Should the butt joint in the metal framing run horizontally, tapes must first be applied to the jambs so that it crosses over the joint.
- 2. Each tape section shall butt the adjoining tape and be united with a tool to eliminate any opening.
- 3. Do not overlap the adjoining length of tape or rubber shim as this will prevent full contact around the perimeter of glass.

# L. Off-Set Glazing

1. Where the glazing legs are off-set, the difference in the rabbet width shall be compensated by employing different glazing tapes with different diameter shims. The difference in shim shall be equal to the size of the off-set. The thinner tape shall be positioned first on the glazing leg closest to the interior. The thicker tape

- shall be cut to the exact length of the dimension between the applied tapes, and installed on the outermost glazing leg.
- 2. Immediately prior to setting glass, paper backing shall be removed. Apply a toe bead of sealant 6" in each direction, from each corner.
- 3. Locate setting blocks in the sill member at quarter points, or if necessary to within 6" of each corner. Setting blocks must be set equal distance from center line of the glass and high enough to provide the recommended bite and edge clearances.
- 4. Set edge block according to glass manufacturer's recommendations.
- 5. Set Glass: The glass shall be pressed firmly against the tape to achieve full contact.
- 6. In a vented system, apply a heel bead (air seal) of sealant around the perimeter of glass, between the sole of the I.G. unit and the base of the rabbet of the metal framing developing a positive bond to the unit and to the metal framing. The bead of the sealant shall be deep enough so that it will partially fill the channel to a depth of 1/4" between the glass edge and the base of the metal framing rabbet.
- 7. Interior stops shall be set, and glazing tape spline for the appropriate face clearance shall be rolled into place, compressing the glass to the shim within the glazing tape.

## 3.5 TAPE GLAZING

- A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.
- B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.
- C. Where framing joints are vertical, cover these joints by applying tapes to heads and sills first and then to jambs. Where framing joints are horizontal, cover these joints by applying tapes to jambs and then to heads and sills.
- D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.
- E. Do not remove release paper from tape until just before each glazing unit is installed.
- F. Apply heel bead of elastomeric sealant as recommended by glass manufacturer or glass frame manufacturer.
- G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against

- faces of removable stops. Start gasket applications at corners and work toward centers of openings.
- H. Apply cap bead of elastomeric sealant over exposed edge of tape where noted on approved shop drawings.

# 3.6 GASKET GLAZING (DRY)

- A. Fabricate compression gaskets in lengths recommended by gasket manufacturer to fit openings exactly, with stretch allowance during installation.
- B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
- C. Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.
- D. Install gaskets so they protrude past face of glazing stops.

# 3.7 SEALANT GLAZING (WET)

- A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.
  - 1. Exterior glazing gasket shall be set a minimum of 1/8" below exterior glazing stop to create a channel for sealant installation.
- B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.
- C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

## 3.8 FRAMELESS MIRRORS

- A. Apply mastic to back of mirror "pats" spaced 4 pats/sq. ft.; adjust mirror so that it is plumb and in place to avoid distortion of reflecting images. Allow 1/8" space between back of mirror and wall surface.
  - 1. Apply "pats" using Palmer Electric Applicator.

B. Apply stainless steel clips at mirror top and bottom; securely clip to substrate using non-corrosive anchors. At drywall back-up anchors must be secured to studs or steel wallplate spanning from stud to stud.

#### 3.9 PROTECTION AND CLEANING

- A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for build-up of dirt, scum, alkaline deposits, or stains; remove as recommended by glass manufacturer.
- D. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged in any way, including natural causes, accidents, and vandalism, during construction period.
- E. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.
- F. Glass to be cleaned according to:
  - 1. GANA Glass Information Bulletin GANA 01-0300 "Proper Procedure for Cleaning Architectural Glass Products."
  - 2. GANA Glass Informational Bulletin GANA TD-02-0402 "Heat Treated Glass Surfaces are Different."
- G. Do not use razor blades, scrapers or metal tools to clean glass.

**END OF SECTION** 



#### **PART 1 GENERAL**

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the louvers as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Aluminum louvers.
  - 2. Blank-off panels.
  - 3. Bird screens.

## 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Joint Sealers Section 079200.
- C. HVAC Division 23, for louvers connected to ductwork.

#### 1.4 QUALITY ASSURANCE

## A. Performance Requirements

- Structural Performance: Provide exterior metal louvers capable of withstanding the effects
  of loads and stresses from wind and normal thermal movement without evidencing
  permanent deformation of louver components including blades, frames, and supports;
  noise or metal fatigue caused by louver blade rattle or flutter or permanent damage to
  fasteners and anchors.
  - Wind Load: Uniform pressure (velocity pressure) of 30 lbf/sq. ft., acting inward or outward
- 2. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, and other detrimental effects.
  - a. Temperature Change (Range): 120 deg. F., ambient; 180 deg. F, material surfaces.
- 3. Louver shall be rated for less than 0.15" pressure drop on intake and less than 0.3 ounces per square foot water penetration at 800 FPM free area velocity. Louver shall be rated by AMCA and bear their label.
- B. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.
- C. Field Measurements: Verify size, location and placement of louver units prior to fabrication.
- D. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

# 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, certified test data, where applicable, and installation instructions for required products, including finishes.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining

- work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.
- C. Samples: Submit six (6) inch square samples of each required finish. Prepare samples on metal of same gauge and alloy to be used in work. Where normal color and texture variations are to be expected, include two (2) or more units in each sample showing limits of such variations.

#### 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

## PART 2 PRODUCTS

#### 2.1 LOUVER MATERIAL

- A. Provide fixed, horizontal, drainable-blade, storm-resistant extruded aluminum louvers of profiles shown on drawings, manufactured by Construction Specialties, Inc., Airolite, Greenheck or Ruskin.
- B. Heads, sills, jambs, blades and mullions to be one piece structural members of 6063-T52, alloy, 0.081" thick, with integral caulking slot and retaining beads. Closed cell PVC compression gaskets to be provided between bottom of mullion or jamb and top of sill to insure lead tight connections. Concealed structural supports to be designed by the louver manufacturer to carry a wind load of not less than forty (40) lbs. per square foot. All fasteners to be stainless steel.
- C. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
  - Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system
    consisting of specially formulated inhibitive primer and fluoropolymer color topcoat
    containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with
    AAMA 2605-02.
  - 2. Custom color and gloss as selected by the Architect.
- D. Louvers shall be furnished with 1/2" mesh, 0.063" diameter aluminum wire intercrimp bird screen secured in removable extruded aluminum frames.
- E. Provide aluminum blank-off panels behind louvers where shown on mechanical drawings, fabricated from 1/8" thick aluminum face sheets, finish to match louvers; reinforce as required to

- form rigid assembly. Blank-off panels shall be insulated with thermafiber insulation of thickness needed to insure an R value of eleven (11).
- F. Fastenings: Fasteners for exterior application shall be stainless steel. Provide types, gauges and lengths to suit unit installation conditions. Use Phillips flat head machine screws for exposed fasteners, unless otherwise indicated.
- G. Anchors and Inserts: Use non-ferrous metal or hot dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled in place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- H. Bituminous Paint: SSPC-Paint 12 (cold applied asphalt mastic).

## 2.2 LOUVER FABRICATION, GENERAL

- A. Fabricate frames including integral sills to suit adjacent construction with tolerances for installation, including application of sealants in joints between louvers and adjoining work.
- B. Include supports, anchorages, and accessories required for complete assembly.
- C. Provide sill extensions made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.
- D. Join frame members to one another and to stationary louver blades by welding, except where indicated otherwise or where field bolted connections between frame members are necessary by size of louvers. Maintain equal blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

#### PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where louvers are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions and directions for the installation of anchorages which are to be embedded in masonry construction. Coordinate the delivery of such items to the project site.

## 3.3 INSTALLATION OF LOUVERS

- A. Locate and place louver units plumb, level and in proper alignment with adjacent work.
- B. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.
- D. Repair finishes damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Restore finishes and prime coats of paint so that there is no evidence of corrective work. Return items which cannot be refinished in the field to the shop, make the required alterations, and refinish the entire unit, or provide new units, at Contractor's option.
- E. Protect aluminum surfaces from corrosion by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.
- F. Provide concealed gaskets, flashings, joint fillers and insulations, and install as the work progresses to make the installations weathertight.

## 3.4 ADJUSTING AND CLEANING

- A. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- B. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

**END OF SECTION** 



#### PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - i. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete interior glass-fiber-reinforced plastic fabrications as shown on drawings and/or specified herein including, but not limited to the following
  - 1. Factory-molded, glass-fiber-reinforced fabrications for interior use include the following types:

- a. Column covers, molded to custom shape as detailed on the drawings.
- 2. Steel framing for direct support of glass-fiber-reinforced fabrications.

## 1.3 RELATED SECTIONS

- A. Carpentry Section 062000.
- B. Gypsum Drywall Section 092900.
- C. Painting and Finishing Section 099000.

## 1.4 SUBMITTALS

- A. Product Data: For each type of glass-fiber-reinforced fabrication indicated. Include construction details, material descriptions, weights, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show profiles, thicknesses, finishes, joints, ornamentation, installation tolerances, and anchorage details. Indicate attachment methods, embedded supports, reinforcement, fabrication methods, joint treatments, clearances, and supports.
  - 1. Show connection to suspension system and cutouts for sprinklers, diffusers, grilles, speakers, and lighting fixtures.
- C. Samples: For each exposed product in each profile and size required, and as follows:
  - 1. 2-foot long section with finished joint. Show complete pattern.
- D. Installer Qualification Data: To demonstrate capabilities and experience of Installer. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, indicating current glass-fiber-reinforced fabrications comply with ASTM C 1355 requirements.

## 1.5 QUALITY ASSURANCE

- A. All products of this section shall me FM Global requirements.
- B. Installer Qualifications: An experienced installer who has completed glass-fiber-reinforced plastic fabrication installations similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

- D. Fire-Test-Response Characteristics: Provide glass-fiber-reinforced fabrications with the following surface-burning characteristics as determined by testing identical products per ASTM E 84 by UL or another independent testing and inspecting agency acceptable to authorities having jurisdiction:
  - 1. Flame Spread: 25 or less.
  - 2. Smoke Developed: 450 or less.
- E. Mockups: Before installing glass-fiber-reinforced fabrications, build mockups for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
  - 1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 4. Obtain Architect's approval of mockups before starting glass-fiber-reinforced plastic fabrication.
  - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 6. Demolish and remove mockups when directed.
  - 7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

# 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Ship and store glass-fiber-reinforced fabrications in factory-wrapped crates, packaged to keep units dry. Avoid cracking, warping, or staining the units.
- B. Comply with manufacturer's written instructions for storage, temperature, and humidity requirements.

## 1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install glass-fiber-reinforced fabrications until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

- B. Acclimatize glass-fiber-reinforced fabrications to ambient temperature and humidity of spaces in which they will be installed. Remove packaging and move units into installation spaces not less than 48 hours before installing them.
- C. Field Measurements: Where glass-fiber-reinforced fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
  - Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating products without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

#### 1.8 COORDINATION

A. Coordinate layout and installation of glass-fiber-reinforced fabrications and suspension system components with other construction, including ceilings, light fixtures, HVAC equipment, fire-suppression-system components, and partition assemblies.

#### PART 2 PRODUCTS

#### 2.1 MANUFACTURER

A. Custom glass fiber reinforced polymer (GFRP) fabrications manufactured by Formglas (basis of design), molded to custom shape, Class A fire rating, high impact resistance, smooth finish for field finishing in color Cloud White, bond filler at joints for inconspicuous connections of parts; Subject to compliance with requirements specified, other acceptable manufacturers are Plastrglas and Plasterform

#### 2.2 MATERIALS

- A. Glass cloth, matt and "chop" shall be equal to the products of PPG or Owens Corning.
- B. Polyester resins shall be General Purpose, promoted thixotropic polyester resin designed for use in hand lay-up and spray processes.
- C. Fasteners: Stainless steel.

# 2.3 FABRICATION

- A. GFRP components shall manufactured using the specified resins, reinforced with chopped glass fibers.
- B. Internal reinforcement, anchorage clips, brackets, and additional glass fiber and matt shall be provided as required by the structural design.

- C. Final ratio of materials, other than metal shall be 25% ratio, 75% fiber for body of components.
- D. Joints in components shall be matched at the factory and numbered for filed installation.
- E. Components shall be fabricated to minimize exposed fasteners.
- F. Components shall have a smooth paint grade finish.
- G. Tolerances: Conform to the following:
  - 1. Dimensional (all directions): +/- 3/16".
  - 2. Thickness: +/- 1/4" + 1/8".
  - 3. Warpage or Bowing: Not to exceed 1/4".

#### 2.4 STEEL FRAMING COMPONENTS

- A. Framing Components: As indicated and that comply with steel framing components specified in Section 092900, "Gypsum Drywall."
- B. Cast-in-Place and Postinstalled Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials, with holes or loops for attaching hanger wires and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing according to ASTM E 488 conducted by a qualified independent testing agency.
  - 1. Cast-in-place type designed for attachment to concrete forms.
  - Chemical anchor.
  - 3. Expansion anchor.
- C. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing according to ASTM E 1190 conducted by a qualified independent testing agency.
- D. Steel Studs and Runners: ASTM C 645, with flange edges of studs bent back 90 degrees and doubled over to form 3/16-inch-wide minimum lip (return), and complying with the following requirements for minimum thickness of base (uncoated) metal and for depth:
  - 1. Thickness: 0.0329 inch, unless otherwise indicated.

- 2. Depth: As indicated, or required to support assemblies and as shown on approved shop drawings.
- 3. Protective Coating: ASTM A 653, G40 hot-dip galvanized coating.
- E. Fasteners for Metal Framing: Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing members securely to substrates.

## 2.5 AUXILIARY MATERIALS

- A. Adhesives: As recommended in manufacturer's written instructions.
- B. Steel Drill Screws: Provide fasteners, complying with the following requirements, that are of sufficient length and size to securely fasten gypsum-reinforced fabrications to framing members:
  - 1. Screws complying with ASTM C 1002 for fastening glass-fiber-reinforced fabrications to steel members less than 0.033 inch thick.
  - 2. Screws complying with ASTM C 1002 for fastening glass-fiber-reinforced fabrications to wood members.
  - 3. Screws complying with ASTM C 954 for fastening glass-fiber-reinforced fabrications to steel members from 0.033 to 0.112 inch thick.
- C. Joint Treatment Materials: Provide materials complying with ASTM C 475 and with the recommendations of the manufacturers of both glass-fiber-reinforced fabrications and joint treatment materials for each application indicated.
- D. Control Joints: One-piece control joint with V-shaped slot and removable strip covering slot opening, formed from steel sheet zinc-coated by hot-dip process or from rolled zinc, and complying with ASTM C 1047.

## 2.6 FABRICATION

- A. Fabricate glass-fiber-reinforced plastic units from molds constructed of rigid materials that will result in smooth-finished surfaces conforming to profiles, dimensions, and tolerances indicated, minimum shell thickness shall be 1/4". Provide units as large as practical to minimize joints.
- B. Remove units from molds and repair hollows, voids, scratches, and other surface imperfections.
- C. Material Compatibility: Fabricate glass-fiber-reinforced fabrications with surface characteristics required for a high-gloss paint finish.

- Embedments: Incorporate embedments so they develop the full strength of glass-fiber-D. reinforced fabrications. Cover embedments with glass-fiber-reinforced plastic composite not less than 3/16 inch thick.
- Connection Hardware: Custom designed and fabricated to support and connect glassfiber-reinforced fabrications to hangers, support framing, and substrates.

## PART 3 EXECUTION

#### 3.1 **EXAMINATION**

- Examine conditions, with Installer present, for compliance with requirements for A. environmental conditions, installation tolerances, and other conditions affecting performance of glass-fiber-reinforced fabrications.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 STEEL FRAMING INSTALLATION

- Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with details indicated. Select framing components of type, size, and spacing needed to support weight of glass-fiber-reinforced fabrications and to maintain erection tolerances.
- Supplementary Framing, Blocking, and Bracing: Install supplementary framing as required not only to support glass-fiber-reinforced fabrications but also fixtures and other items penetrating glass-fiber-reinforced fabrications.

#### 3.3 GLASS-FIBER-REINFORCED PLASTIC FABRICATION INSTALLATION

- Install glass-fiber-reinforced fabrications level, plumb, true, and aligned with adjacent A. materials. Use concealed shims where required for alignment.
- Predrill fastener holes in glass-fiber-reinforced fabrications. Clean fastener holes to remove dirt and oil.
- Attach glass-fiber-reinforced fabrications to framing and substrates with steel drill screws. Do not use pneumatic staple guns. Countersink screw heads below adjoining finished surface.
- D. Fasten as required to comply with dimensional tolerances and not less than 5/16 inch from edge to end.
- Cover screw heads with joint compound to produce flush, smooth, and level finished surfaces.

- F. Attach glass-fiber-reinforced fabrications at joints with adhesive, and band or brace together until adhesive is cured. Cure adhesive according to glass-fiber-reinforced plastic fabrication manufacturer's written instructions.
- G. Install control joints where indicated.
- H. Joint Finishing: Comply with ASTM C 840 for the following finish level:
  - 1. Level 5.

# 3.4 ERECTION AND LOCATION TOLERANCES

- A. Erection Tolerances: Install glass-fiber-reinforced fabrications so each unit complies with the following dimensional requirements:
  - 1. Plane Alignment (Panel to Panel): 1/16 inch.
  - 2. Variation from Plumb: Plus or minus 1/8 inch per 10 feet.
  - 3. Variation from Straightness: Plus or minus 1/4 inch per 25 feet.
  - 4. Assembly Deflection: Not greater than the length of the assembly divided by 240.
  - 5. Joint Alignment: Not more than 1/8 inch.
  - 6. Joint Width: Not more than 3/8 inch.

**END OF SECTION** 

#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the gypsum drywall as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Gypsum board work for partitions, ceilings, column enclosures, furring, and elsewhere where gypsum drywall work is shown on drawings.

- 2. Metal supports for gypsum drywall construction.
- 3. Acoustical insulation for gypsum drywall work.
- 4. Sealant for gypsum drywall work.
- 5. Concealed metal reinforcing for attachment of railings, toilet partitions and other items supported on drywall partitions and walls.
- 6. Taping and finishing of drywall joints.
- 7. Installing rings and frames in drywall surfaces for grilles, registers and lighting fixtures.
- 8. Gypsum wallboard cants at beams and other projections over 2" deep in elevator shafts where adjoining wall is of gypsum wallboard construction.
- 9. Gypsum shaftwall construction.
- 10. Bracing and connections.
- 11. Reveals, expansion joints, corner guards, and other trim or accessories.

## 1.3 RELATED SECTIONS

- A. Thermal Insulation Section 072100.
- B. Hollow metal door frames Section 081113.
- C. Access Doors Section 083113.
- D. Painting and Finishing Section 099000.
- E. Plumbing Division 22.
- F. Mechanical equipment Division 23.
- G. Rings for grilles, registers and light fixtures Division 23 and 26.
- H. AV equipment integrated into ceilings.

## 1.4 QUALITY ASSURANCE

- A. The following standards, as well as other standards which may be referred to in this Section, shall apply to the work of this Section:
  - 1. The Gypsum Construction Handbook, latest edition, USG.
  - 2. Construction Guide, latest edition, National Gypsum.

- 3. ASTM A 568 "Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For"
- 4. ASTM C 475 "Standard Specification for Joint Treatment Materials For Gypsum Wallboard Construction"
- 5. ASTM C 645 "Standard Specification for Non-Structural Steel Framing Members"
- 6. ASTM C 754 "Standard Specification for Installation of Steel Framing Members to Receive Screw Attached Gypsum Panel Products"
- 7. ASTM C 840 "Standard Specification for Application and Finishing of Gypsum Board"
- 8. ASTM C 919 "Standard Specification for Use of Sealants in Acoustical Applications"
- ASTM C 954 "Standard Specification for Steel Drill Screws For the Application of Gypsum Board or Metal Plaster Bases to Steel Studs From 0.033 in. to 0.112 in. in Thickness"
- ASTM C 1002 "Standard Specification for Steel Self-Piercing Tapping Screws For the Application of Gypsum Board"
- 11. ASTM C 1177 "Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing"
- 12. ASTM C 1178 "Standard Specification for Glass Mat Water Resistant Gypsum Backing Board"
- 13. ASTM C 1278 "Standard Specification for Fiber-Reinforced Gypsum Panel"
- 14. ASTM C 1396 "Standard Specification for Gypsum Board"
- 15. ASTM D 3273 "Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber"
- B. Allowable Tolerances: 1/32" offsets between planes of board faces, and 1/16" in 8'-0" for plumb, level, warp and bow.
- C. System Design Load
  - Provide drywall shaft systems for elevators designed and tested by manufacturer to withstand a lateral loading (air pressure) of 10 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.

- 2. Provide standard drywall wall assemblies designed and tested by manufacturer to withstand a lateral load of 5 lbs. per sq. ft. for the maximum wall height required, and with deflection limited to L/240 of partition height.
  - a. Drywall assemblies with tile finish shall have a deflection limit of L/360.
- 3. Provide drywall ceiling assemblies designed, fabricated and installed to have a deflection not to exceed L/360.
- D. Fire-Resistance Rating: Where gypsum drywall with fire resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories, or to design designations in UL "Fire Resistance Directory" or in listing of other testing agencies acceptable to authorities having jurisdiction, and compliant with UL Test #2079; criteria for cycle movement for all field height wall sections requiring allowance for vertical deflection within framing details.
- E. Installer: Firm with not less than 5 years of successful experience in the installation of specified materials.

## 1.5 SUBMITTALS

- A. Submit shop drawing for each drywall partition, furring and ceiling system showing size and gauges of framing members, hanger and anchorage devices, wallboard types, insulation, sealant, methods of assembly and fastening, control joints indicating column lines, corner details, joint finishing and relationship of drywall work to adjacent work.
- B. Samples: Each material specified herein, 12" x 12", or 12" long, or in manufacturer's container, as applicable for type of material submitted.
- C. Manufacturer's Literature: Submit technical and installation instructions for each drywall partition, furring and ceiling system specified herein, and for each fire-rated and sound-rated gypsum board assembly. Submit other data as required to show compliance with these specifications, including data for mold resistant joint compound.
- D. Test Reports: This Contractor shall submit test report, obtained by drywall manufacturer, indicating conformance of drywall assemblies to required fire ratings and sound ratings.

#### 1.6 PRODUCT HANDLING AND PROTECTION

- A. Deliver, store and handle drywall work materials to prevent damage. Deliver materials in their original, unopened containers or bundles, and store where protected from moisture, damage and from exposure to the elements. Store wallboard in flat stacks.
- B. Protect wallboard from becoming wet.

#### 1.7 ENVIRONMENTAL CONDITIONS

A. Provide and maintain minimum temperature of fifty-five (55) degrees F. and adequate ventilation to eliminate excessive moisture within the building in the area of the drywall work for at least twenty-four (24) hours, prior to, during and after installation of drywall work. Installation shall not start until windows are glazed and doors are installed, unless openings are temporarily closed. Space above suspended ceilings shall be vented sufficiently to prevent temperature and pressure build up.

## 1.8 JOB MOCK-UP

- A. At a suitable location, where directed by the Architect, lay up a portion of a finished wall and ceiling demonstrating the quality of work, including finishing, to be obtained under this Section. Omit drywall boards in locations as directed by the Architect to show stud spacing and attachments; after acceptance, complete assembly.
- B. Adjust the finishing techniques as required to achieve the finish required by the Architect as described in this Section of these specifications.
- C. Upon approval of the mock-up, the mock-up may be left in place as a portion of the finished work of this Section.
- D. All drywall work shall be equal in quality to approved mock-up.

#### PART 2 PRODUCTS

## 2.1 MANUFACTURERS

- A. for Gypsum Drywall Panels and Accessories: U.S. Gypsum Co., Georgia Pacific, CertainTeed Corporation, Continental Building Products, or National Gypsum Co. meeting specification requirements are acceptable.
  - 1. All drywall products must be manufactured in North America.
- B. Acceptable Manufacturers for Metal Supports of Drywall Assemblies: Provide products manufactured by ClarkDietrich Building Systems, Super Stud Building Products, Marino/Ware.

## 2.2 METAL SUPPORTS

- A. Metal Floor and Ceiling Runners
  - 1. Channel Type: Formed from 20 U.S. Std. gauge (unless otherwise noted) galvanized steel, width to suit channel type metal studs. Use 20 ga. top runners with 1-1/4" minimum flanges.

- 2. Ceiling runners and head of wall connections at rated partitions shall conform to UL #2079 for cycle movement. Provide positive mechanical connection of framing to structure, allowing for vertical movement within connections. Minimum of 20 ga. galvanized steel for clips, 25 ga. galvanized steel for ceiling runners. Providing a friction free anti-seizure movement capacity.
  - a. As manufactured by the Steel Network, VertiClip or VertiTrack or equal made by Metal-Lite Inc.
  - b. FireTrak (including stud clips) by FireTrak Corp. or equal made by Metal-Lite Inc.
- 3. "J" Type: Formed from 20 U.S. Std. gauge galvanized steel, 1" x 2-1/2" or 4" wide (to suit detail) x 2-1/4" (for shaft wall).

# B. Metal Studs, Framing and Furring

- 1. Channel Type Studs: Channel type with holes for passage of conduit formed from minimum 20 U.S. Std. gauge (unless heavier gauge is required to meet deflection limits) galvanized steel, width as shown on drawings.
- 2. Furring Channels: Hat shaped, formed from galvanized steel, 25 U.S. Std. gauge.
- 3. "C-H," "CT," or "I" Type Stud: 1-1/2" x 2-1/2", 4" or 6" wide (to suit detail) galvanized steel. Use for shaft wall construction; gauge and size as required to meet deflection limits given herein.
- 4. Double "E" Type Stud or "J" Track with Holding Tabs: 1" x 2-1/2", 4" or 6" wide (to suit detail) galvanized steel. Use for shaft wall construction; gauge and size as required to meet deflection limits given herein.
- 5. Continuous 16 gauge x 8" wide steel wall plate screwed to studs as required for support of railings, toilet partitions and other items supported on drywall partitions and walls.

# C. Suspended Ceiling and Fascia Supports

- 1. Main Runners: 1-1/2" steel channels, cold rolled at 0.475 lbs. per ft., rust-inhibitive paint finish.
- 2. Furring Members: Screw-type hat-shaped furring channels of 25 ga. zinc-coated steel; comply with ASTM C 645.
- 3. Hangers: Galvanized, 1" x 3/16" flat steel slats capable of supporting 5x calculated load supported.
- 4. Hanger Anchorages: Provide inserts, clips, bolts, screws and other devices applicable to the required method of structural anchorage for ceiling hangers. Size devices for 5x calculated load supported.

- 5. Furring Anchorages: 16 ga. galvanized wire ties, manufacturer's standard clips, bolts or screws as recommended by furring manufacturer.
- 6. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
  - a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, Armstrong World Industries, Inc. Drywall Grid System; USG Corporation Drywall Suspension System; CertainTeed Drywall Grid.
- D. All galvanized steel members shall have coating conforming to ASTM A 653, G60.

## 2.3 GYPSUM WALLBOARD TYPES

- A. Gypsum Wall Board: 5/8" thick "Sheetrock" by USG, "Gold Bond" by National Gypsum, or "Regular Gypsum" by CertainTeed Corp., 48" wide, in maximum lengths available to minimize end-to-end butt joints.
- B. Fire Rated Gypsum Wall Board: 5/8" thick "Sheetrock Firecode C" by USG, "Firecheck Type C" by Lafarge/Continental, or "Gold Bond Fireshield" by National Gypsum, 48" wide, in maximum lengths available to minimize end-to-end butt joints.
- C. Water Resistant Backing Board for Tile Finish: 5/8" thick, "Fiberock Aqua-Tough" by USG, "Dens-Shield Tile Backer Board" by Georgia Pacific, or "DiamondBack Tile Backer" by CertainTeed Corp. Cover joints with a pressure sensitive woven glass fiber tape equal to Imperial Type P Tape.
- D. Moisture/Mold Resistant Gypsum Wall Board at locations listed below, unless otherwise shown on drawings: 5/8" thick "Mold Tough" or "Mold Tough FR" by U.S. Gypsum, "DensArmor Plus" by Georgia Pacific, "Mold Defense" and/or "Mold Defense Type X" by Lafarge/Continental, or "Gold Bond EXP Interior Extreme Gypsum Board" by National Gypsum, 48" wide, in maximum lengths available to minimize end-to-end butt joints. Board must have a rating of 10 per ASTM D 3273 with a core that meets ASTM C 1396, Section 6 or ASTM C 1658.
  - 1. Areas in toilet rooms, lockers, janitor's closets not scheduled to receive ceramic tile, or where fire rating is required.
  - 2. Interior faces of exterior walls of basements, cellars and other below grade rooms.
  - 3. Walls and ceilings of spaces containing condensers, water tanks, water pumps and pressure reduction valves.
  - 4. Walls and ceilings of laundry rooms.
  - 5. Portions of walls within 2 feet of kitchen sinks to a height of 4 feet above the floor.

- 6. Portions of walls within 2 feet of kitchen stoves to a height of 4 feet above the floor.
- 7. Walls of bathrooms that are not solely water closet compartments, other than walls specifically required to be cement board.
- 8. Walls and ceilings in service sink closets.
- 9. Portion of walls within 2 feet of mop sinks or service sinks to a height of 4 feet above the floor.
- 10. All perimeter walls and wet shafts.
- E. Mold Resistant Shaft Wall Liner: Solid gypsum board liner for shaft wall construction, 1" thick, 24" wide, as required to suit condition, by standard lengths as required, beveled edges. Provide "Mold Tough Liner Panel" by USG, "DensGlass Ultra Shaft Guard" by Georgia Pacific, "Mold Defense Shaftliner Type X" and/or "Weather Defense Shaftliner Type X" by Lafarge/Continental, or "Gold Bond Brand Fireshield Shaft Liner XP," "Gold Bond Brand EXP Extended Exposure Shaft Liner" by National Gypsum, or "M2Tech Shaftliner" by CertainTeed Corp.
  - Liner board must have a rating 10 per ASTM D 3273 with a core that meets ASTM C 1396 Section 6.
- F. Cement Board (for tile backer board in all locations of wall or base tile, and for resinous flooring base installation, including partial or full height walls and wherever else scheduled): 1/2" thick "Durock Tile Backer Board" by USG, "Wonder Board Lite" by Custom Building Products, Hardie Backer Board by James Hardie.

#### 2.4 ACCESSORIES

- A. Acoustical Insulation: Paper-less, non-combustible, semi-rigid mineral fiber mat, 2" thick, in walls (unless otherwise indicated), 3 lb./cu. ft. maximum density; Thermafiber LLC "Thermafiber," Roxul or Fibrex.
- B. Fasteners for Wall Board: USG Brand Screws; Type S Bugle Head for fastening wallboard to lighter gauge interior metal framing (up to 20 ga.). Type S-12 Bugle Head for fastening wallboard to heavier gauge interior metal framing (20 ga. to 12 ga.); Type S and Type S-12 Pan Head for attaching metal studs to door frames and runners; and Type G Bugle Head for fastening wallboard to wall board. Lengths specified below under "Part 3 Execution" Articles and as recommended by drywall manufacturer.
- C. Laminating Adhesive: As per one of the manufacturers listed above
- D. Metal Trim Corner Beads: For 90 degree External Corners "Dur-A-Bead" No. 103, 27 U.S. Std. ga. galvanized steel, 1-1/4" x 1-1/4", for 90 degree external corners.

- E. Metal Trim Edge Beads: "Sheetrock Brand Paper Faced Metal Bead and Trim." Or one of the manufacturers listed above
- F. Metal Trim Treatment Materials and Joint Treatment Materials for Gypsum Drywall Boards: Paper tape for joint reinforcing; Setting Type (Durabond 90) or Lightweight Setting Type Joint Compound for taping and topping; and Ready Mix Compound for finishing.
  - For mold-resistant drywall, water resistant drywall, and tile backer board, use glass mesh tape with setting joint compound that is rated 10 when tested in accordance with ASTM D 3273 and evaluated in accordance with ASTM D 3274. Acceptable joint compound is "Rapid Set One Pass" made by CTS Cement Manufacturing Corp. or "Rapid Joint" manufactured by Lafarge North America, US Gypsum or Georgia Pacific.
- G. Control Joints: No. 0.093 by USG, and two-piece tapable control joint by Fry Reglet, Pittcon Industries or Gordon, Inc..
- H. Acoustical Sealant: USG "Acoustical Sealant" or "Tremco Acoustical Caulking" of Tremco Mfg. Co., GE Acoustical Sealant.
- Neoprene Gaskets: Conform to ASTM D 1056.
- J. Aluminum Reveal Trim: Extruded accessories of profiles and heights as indicated. Provide products of Fry Reglet, or equal by Gordon Inc., Pittcon Industries, fabricated of 0.062" thick aluminum sheet, mill finish, of alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
- K. Aluminum Trim Base: Extruded aluminum of profile(s) indicated. Provide products of Fry Reglet Corp., or comparable product of Milgo Bufkin, Gordon, Inc., fabricated of 0.062" thick aluminum sheet, mill finish, of alloy and temper with not less than the strength and durability properties of ASTM B 221, Alloy 6063-T5.
- L. Stainless steel corner guards mounted flush with drywall taping flanges by InPro Corporation, Model SSEW-FM, other acceptable manufacturers are Wallguard 2331 Series or Alpar Architectural Products CG-510, stainless steel with No. 4 finish.
- M. Extruded aluminum drywall edge trim, 12'-0" lengths, including prefabricated corners, with taping edge for seamless integration into drywall ceiling soffit, Gordon Interior Specialties 8' Drop Point (basis of design), other acceptable manufacturers are Armstrong Axiom Knife Edge trim and Pittcon Softforms Knife Edge Trim PT-KE, ready for field finishing to match ceiling finish.
- N. Extruded aluminum drywall edge trim, 12' lengths, Pitcon STA-075, for field finishing to match ceiling finish, other acceptable manufacturers are Fry Reglet and Gordon Inc. Interior Specialties.

O. Aluminum 2 piece reveal Expansion Joint Trim: Profiles and details shown on the drawings are those of Fry Reglet Drywall Expansion Joint. Subject to compliance with specified requirements other acceptable manufacturers are Pittcon Softforms SWR-CJ\_ Series, and Trim-Tex Drywall Hideaway Expansion

#### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where gypsum drywall is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 GENERAL INSTALLATION REQUIREMENTS

#### A. General

- 1. Install drywall work in accordance with drywall manufacturer's printed instructions and as indicated on drawings and specified herein.
- 2. All metal framing for drywall partitions shall extend from floor to underside of structural deck above. Provide for vertical deflection with positive mechanical connections of framing members to structure.
- 3. Provide concealed reinforcement, 16 ga. thick by eight (8) inches wide or as detailed or as recommended by manufacturer, for attachment of railings, toilet partitions, and other items to be supported on the partitions which cannot be attached to the metal framing members. Concealed reinforcement shall span between metal studs and be attached thereto using two (2) self-tapping pan head screws at each stud.
  - a. Back of drywall shall be scored or notched to prevent bulging out where reinforcement plate occurs.
- B. Fire-Rated Assemblies: Install fire-rated assemblies in accordance with requirements of authorities having jurisdiction, Underwriters' Laboratories and test results obtained and published by the drywall manufacturer, for the fire-rated drywall assembly types indicated on the drawings.
- C. Acoustical Assemblies: Install acoustically-rated assemblies to achieve a minimum STC as noted on drawings, in accordance with test results obtained and published by the drywall manufacturer, for the drywall assembly type indicated on the drawings.

### D. Sealant

- Install continuous acoustical sealant bead at top and bottom edges of wallboard where indicated or required for sound rating as wallboard is installed, and between metal trim edge beads and abutting construction.
- Install acoustical sealant in 1/8" wide vertical control joints within the length of the
  wall or partitions, and in all other joints, specified below under "Control Joints."
  Install bead of acoustical sealant around electric switch and outlet boxes, piping,
  ducts, and around any other penetration in the wallboard; place sealant bead
  between penetrations and edge of wallboard.
- 3. Where sealant is exposed to view, protect adjacent surfaces from damage and from sealant material, and tool sealant flush with and in same plane as wallboard surface. Sealant beads shall be 1/4" to 3/8" diameter.

# E. Wall Board Application

- 1. Do <u>not</u> install wallboard panels until steel door frames are in place; coordinate work with Section 081113, "Steel Doors and Frames."
- 2. See drawings for all board types. Use fire-rated wallboard for fire-rated assemblies. Use water-resistant wallboard where indicated on drawings and where wallboard would be subject to moisture. Install water-resistant wallboard in full, large sheets (no scraps) to limit number of butt joints.
- 3. Apply wallboard with long dimension parallel to stud framing members, and with abutting edges occurring over stud flanges.
- 4. Install wallboard for partitions from floor to underside of structure above and secure rigidly in place by screw attachment, unless otherwise indicated.
- 5. Provide mineral safing insulation meeting standards of Section 078413 at flutes of metal deck where partitions carry up to bottom of metal deck.
- 6. Neatly cut wallboard to fit around outlets, switch boxes, framed openings, piping, ducts, and other items which penetrate wallboard; fill gaps with acoustic sealant.
- 7. Where wallboard is to be applied to curved surfaces, dampen wallboard on back side as required to obtain required curve. Finish surface shall present smooth, even curve without fluting or other imperfections.
- 8. Screw fasten wallboard with power-driven electric screw driver, screw heads to slightly depress surface of wallboard without cutting paper, screws not closer than 3/8" from ends and edges of wallboard.
- 9. Where studs are doubled-up, screw fasten wallboard to both studs in a staggered pattern.

### F. Cementitious Backer Board

- 1. General: Furnish cementitious backer board in maximum available lengths. Install horizontally, with end joints over framing members.
- 2. Fastening: Secure cementitious backer board to each framing member with screws spaced not more than 12 inches on center and not closer than 1/2" from the edge. Install screws with a conventional screw gun so that the screw heads are flush with the surface of the board.
- 3. Joint Treatment: Fill space between edge of backer and receptor with dry-set Portland cement or latex-Portland cement mortar. Fill all horizontal and vertical joints and corners with dry-set Portland cement or latex-Portland cement mortar. Apply fiberglass tape over joints and corners and embed with same mortar.
- G. Metal Trim: Install and mechanically secure in accordance with manufacturer's instructions; and finish with three (3) coats of joint compound, feathered and finish sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions.
  - 1. Corner Beads: Install specified corner beads in single lengths at all external corners, unless corner lengths exceed standard stock lengths.
  - 2. Edge Beads: Install specified edge beads in single lengths at all terminating edges of wallboard exposed to view, where edges abut dissimilar materials, where edges would be exposed to view, and elsewhere where shown on drawings. Where indicated on drawings, seal joint between metal edge bead and adjoining surface with specified gasket, 1/8" wide minimum and set back 1/8" from face of wallboard, unless other size and profile indicated on drawings.
  - 3. Casing beads shall be set in long lengths, neatly butted at joints. Provide casing beads at juncture of board and vertical surfaces and at exposed perimeters.
- H. Control Joint Locations: Gypsum board surfaces shall be isolated with control joints where:
  - Locations of control joints are shown in the architectural elevation drawings, including gypsum board walls with tile finishes. Where joints are not shown but are required under this section, provide sketches showing locations for approval by the architect.
  - 2. Ceiling abuts a structural element, dissimilar wall or other vertical penetration.
  - 3. Construction changes within the plane of the partition or ceiling.
  - 4. Shown on approved shop drawings.
  - 5. Ceiling dimensions exceed thirty (30) feet in either direction.

- 6. Wings of "L," "U," and "T" shaped ceiling areas are joined.
- 7. Expansion or control joints occur in the structural elements of the building.
- 8. Shaftwall runs exceed 30' without interruption.
- 9. Partition or furring abuts a structural element or dissimilar wall or ceiling.
- 10. Partition or furring runs exceed 30' without interruption.
- 11. Where control joints are required, ceiling height door frames may be used as control joints.
- 12. Additional locations as shown on the architectural drawings, elevations and ceiling plans.
- I. Joint Treatment and Spackling
  - Joints between face wallboards in the same plane, joints at internal corners of intersecting partitions and joints at internal corners of intersections between ceilings and walls or partitions shall be filled with joint compound.
  - 2. Screw heads and other depressions shall be filled with joint compound. Joint compound shall be applied in three (3) coats, feathered and finish surface sanded smooth with adjacent wallboard surface, in accordance with manufacturer's instructions. Treatment of joints and screw heads with joint compound is also required where wallboard will be covered by finish materials which require a smooth surface, such as vinyl wall coverings.

### 3.3 FURRED WALLS AND PARTITIONS

- A. Use specified metal furring channels. Run metal furring channel framing members vertically, space sixteen (16) inches o.c. maximum. Fasten furring channels to concrete or masonry surfaces with power-driven fasteners or concrete stub nails spaced sixteen (16) inches o.c. maximum through alternate wing flanges (staggered) of furring channel. Furring channels shall be shimmed as necessary to provide a plumb and level backing for wallboard. At inside of exterior walls, an asphalt felt protection strip shall be installed between each furring channel and the wall. Furring channel and splices shall be provided by nesting channels at least eight (8) inches and securely anchoring to concrete or masonry with two (2) fasteners in each wing.
- B. Wallboard Installation: Same as specified under Article 3.4 "Metal Stud Partitions."

# 3.4 METAL STUD PARTITIONS

A. Unless otherwise noted, steel framing members shall be installed in accordance with ASTM C 754.

B. Runner Installation: Use channel type. Align accurately at floor according to partition layout. Anchor runners securely sixteen (16) inches o.c. maximum with power-driven anchors to floor slab, with power-driven anchors to structural slab above. See "Stud Installation" below for runners over heads of metal door frames. Where required, carefully remove sprayed-on fireproofing to allow partition to be properly installed.

# C. Stud Installation

- 1. Use channel type, positioned vertically in runners, spaced as noted on drawings, but not more than sixteen (16) inches o.c.
- Anchor studs to floor runners with screw fasteners. Provide snap-in or slotted hole slip joint bolt connections of studs to ceiling runners leaving space for movement. Anchor studs at partition intersections, partition corners and where partition abuts other construction to floor and ceiling runners with sheet metal screws through each stud flange and runner flange.
- 3. Connection at ceiling runner for non-rated partitions shall be snap-in or slotted hole slip joint bolt connection that shall allow for movement. Seal studs abutting other construction with 1/8" thick neoprene gasket continuously between stud and abutting construction.
- 4. Connections for fire rated partitions at ceiling runners shall conform to UL Design #2079.
- Install metal stud horizontal bracing wherever vertical studs are cut or wallboard is cut for passage of pipes, ducts or other penetrations, and anchor horizontal bracing to vertical studs with sheet metal screws.
- 6. At jambs of door frames and borrowed light frames, install doubled-up studs (not back to back) from floor to underside of structural deck, and securely anchor studs to jamb anchors of frames and to runners with screws. Provide cross braces from hollow metal frames to underside of slab.
- 7. Over heads of door frames, install cut-to-length section of runner with flanges slit and web bent to allow flanges to overlap adjacent vertical studs, and securely anchor runner to adjacent vertical studs with sheet metal screws. Install cut-to-length vertical studs from runner (over heads of door frame) to ceiling runner sixteen (16) inches maximum o.c. and at vertical joints of wallboard, and securely anchor studs to runners with sheet metal screws.
- 8. At control joints, in field of partition, install double-up studs (back to back) from floor to ceiling runner, with 1/4" thick continuous compressible gasket between studs. When necessary, splice studs with eight (8) inches minimum nested laps and attach flanges together with two (2) sheet metal screws in each flange. All screws shall be self-tapping sheet metal screws.

- D. Runners and Studs at Chase Wall: As specified above for "Runners" and "Studs" and as specified herein. Chase walls shall have either a single or double row of floor and ceiling runners with metal studs sixteen (16) inches o.c. maximum and positioned vertically in the runners so that the studs are opposite each other in pairs with the flanges pointing in the same direction. Anchor all studs to runner flanges with sheet metal screws through each stud flange and runner flange following requirements of paragraph 3.4, B. Provide cross bracing between the rows of studs by attaching runner channels or studs set full width of chase attached to vertical studs with one self-tapping screw at each end. Space cross bracing not over thirty-six (36) inches o.c. vertically.
- E. Wallboard Installation Single Layer Application (Screw Attached)
  - Install wallboard with long dimension parallel to framing member and with abutting edge joints over web of framing member. Install wallboard with long dimension perpendicular to framing members above and below openings in drywall extending to second stud at each side of opening. Joints on opposite sides of wall shall be arranged so as to occur on different studs.
  - Boards shall be fastened securely to metal studs with screws as specified. Where
    a free end occurs between studs, back blocking shall be required. Center abutting
    ends over studs. Correct work as necessary so that faces of boards are flush,
    smooth, true.
  - 3. Wallboard screws shall be applied with an electric screw gun. Screws shall be driven not less than 3/8" from ends or edges of board to provide uniform dimple not over 1/32" deep. Screws shall be spaced twelve (12) inches o.c. in the field of the board and 8" o.c. staggered along the abutting edges.
  - 4. All ends and edges of wallboard shall occur over screwing members (studs or furring channels). Boards shall be brought into contact but shall not be forced into place. Where ends or edges abut, they shall be staggered. Joints on opposite sides of a partition shall be so arranged as to occur on different studs.
  - 5. At locations where piping receptacles, conduit, switches, etc., penetrate drywall partitions, provide non-drying sealant and an approved sealant stop at cut board locations inside partition.
- F. Wallboard Installation Double-Layer Application
  - 1. General: See drawings for wallboard partition types required.
  - 2. First Layer (Screw Attached): Install as described above for single layer application.
  - 3. Second Layer (Screw Attached): Screw attach second layer, unless laminating method of attachment indicated on drawings or necessary to obtain required

sound rating or fire rating. Install wallboard vertically with vertical joints offset thirty-two (32) inches from first layer joints and staggered on opposite sides of wall. Attach wallboard with 1-5/8" screws sixteen (16) inches o.c. along vertical joints and sixteen (16) inches o.c. in the field of the wallboard. Screw through first layer into metal framing members.

- 4. Second Layer (Laminated): Install wallboard vertically. Stagger joints of second layer from first layer joints. Laminate second layer with specified laminating adhesive in beads or strips running continuously from floor to ceiling in accordance with manufacturer's instructions. After laminating, screw wallboard to framing members with 1-5/8" screws, spaced twelve (12) inches o.c. around perimeter of wallboard.
- G. Wallboard Installation Laminated Application: Where laminated wallboard is indicated, use specified laminating adhesive, install wallboard vertically and maintain tolerances as specified for screw attached wallboard.
- H. Insulation Installation: Install where indicated on drawings. Place blanket tightly between studs.
- I. Deflection of Structure Above: To allow for possible deflection of structure above partitions, provide top runners for non-rated partitions with 1-1/4" minimum flanges and do not screw studs or drywall to top runner. Where positive anchorage of studs to top runner is required, anchorage device shall be by means of slotted hole (in clip connection with screw attachment to web of steel through bushings located in slots of clips), or other anchorage device approved by Architect.

#### J. Control Joints

- 1. Leave a 1/2" continuous opening between gypsum boards for insertion of surface mounted joint.
- 2. Back by double framing members.
- 3. Attach control joint to face layer with 9/16" galvanized staples six (6) inches o.c. at both flanges along entire length of joint.
- 4. Provide two (2) inch wide gypsum panel strip or other adequate seal behind control joint in fire rated partitions and partitions with safing insulation.

### 3.5 DRYWALL FASCIAS AND CEILINGS

- A. Furnish and install inserts, hanger clips and similar devices in coordination with other work.
- B. Secure hangers to inserts and clips. Clamp or bolt hangers to main runners.

- C. Space main runners 4'-0" o.c. and space hangers 4'-0" o.c. along runners, except as otherwise shown.
- D. Level main runners to a tolerance of 1/4" in 12'-0", measured both lengthwise on each runner and transversely between parallel runners.
- E. Metal Furring Channels: Space sixteen (16) inches o.c. maximum. Attach to 1-1/2" main runner channels with furring channel clips (on alternate sides of main runner channels). Furring channels shall not be let into or come in contact with abutting masonry walls. End splices shall be provided by nesting furring channels no less than eight (8) inches and securely wire tying. At any openings that interrupt the furring channels, install additional cross reinforcing to restore lateral stability.
- F. Mechanical accessories, hangers, splices, runner channels and other members used in suspension system shall be of metal, zinc coated, or coated with rust inhibitive paint, of suitable design and of adequate strength to support units securely without sagging, and such as to bring unit faces to finished indicated lines and levels.
  - 1. Provide special furring where ducts are over two (2) feet wide.
- G. Apply board with its long dimension at right angles to channels. Locate board butt joints over center of furring channels. Attach board with one (1) inch self-drilling drywall screws twelve (12) inches o.c. in field of board at each furring channel; eight (8) inches o.c. at butt joints located not less than 3/8" from edges.

## 3.6 SHAFT WALLS

- A. Runner Installation: Use "J" metal runners at floor and ceiling, with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and twenty-four (24) inches o.c.
- B. Shaft Wall Liner: Cut shaft wall liner panels one (1) inch less from floor to ceiling height and erect vertically between J-runners.
- C. C-H Studs: Cut metal studs 3/8" to not more than 1/2" less than floor to ceiling height and install between shaft wall liner panels so that panels are fitted snugly into the one (1) inch wide "H," "T," or "I" portion of the stud. Space studs twenty-four (24) inches o.c., unless otherwise indicated on drawings. Install full-length steel E-Studs or J-runners vertically at T-intersections, corners, door jambs, and columns. Install full length E-Studs or J-runners over shaft wall liner both sides of closure panels. Frame openings cut within a liner panel with J-Runner around perimeter. For openings, frame with vertical E-Stud or J-runner at edges, horizontal runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall. Install floor-to-ceiling steel E-Studs or J-runners each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two (2) 3/8" Type S screws, space twelve (12) inches o.c. Over metal

- doors, install a cut to length section of runner and attach to strut-studs with clip angles and 3/8" Type S Screws space twelve (12) inches o.c.
- D. Wallboard Installation Double Layer Installation: Erect gypsum wallboard base layer vertically or horizontally to meet fire rating on one side of studs with end joints staggered. Fasten base layer panels to studs with one (1) inch Type S screws twenty-four (24) inches o.c. Caulk perimeter of base layer panels. Apply gypsum wallboard face layer vertically over base layer with joints staggered and attached with 1-5/8" Type S screws staggered from those in base, spaced eight (8) inches o.c. and driven into studs.
- E. Wallboard Installation (Where Both Sides of Shaft Wall are Finished): Apply gypsum wallboard face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with one (1) inch or two (2) inches Type S screws spaced eight (8) inches o.c. in field and along edges into studs.
- F. Cants: Provide one (1) inch thick shaft wall liner, cut to suit condition, at beams and other projections wider than two (2) inches in elevator shafts. Cants shall slope seventy-five (75) degrees from the horizontal. Screw attach shaft wall liner to the vertical metal studs.
- G. Support elevator hoistway door frames independently of drywall shaft framing system, or reinforce system in accordance with system manufacturer's instructions.
- H. Where handrails are indicated for direct attachment to drywall shaft system, provide not less than a sixteen (16) ga. x eight (8) inches wide galvanized steel reinforcement strip, accurately positioned and secured to studs and concealed behind not less than one 1/2" thick course of gypsum board in the system.
- I. Integrate stair hanger rods with drywall shaft system by locating cavity of system as required to enclose rods.

# 3.7 ERECTION AT COLUMN ENCLOSURES

- A. Metal furring supports shall be provided under work of this Section, and shall be cut to lengths as necessary for tight fit such that spacing is not more than sixteen (16) inches o.c.
- B. Board shall be fastened securely to supports with screws as specified. Place boards in position with minimum amount of joints. Where free ends occur between supports, back-blocking or furring shall be required. Center abutting ends over supports. Correct work as necessary so that faces of boards are flush, smooth and true. Provide clips or cross furring for attachment as required.
- C. All layers shall be screw attached to furring.

D. When column finish called for on drawings to be in the same plane as drywall finish layer, maintain even, level plane.

# 3.8 FINISHING

- A. Taping: A thin, uniform layer of compound shall be applied to all joints and angles to be reinforced. Reinforcing tape shall be applied immediately, centered over the joint, seated into the compound. A skim coat shall follow immediately, but shall not function as a fill or second coat. Tape shall be properly folded and embedded in all angles to provide a true angle.
- B. Filling: After initial coat of compound has hardened, additional compound shall be applied, filling the board taper flush with the surface. The fill coat shall cover the tape and feather out slightly beyond the tape. On joints with no taper, the fill coat shall cover the tape and feather out at least four (4) inches on either side of the tape. No fill coat is necessary on interior angles.
- C. After compound has hardened, a finishing coat of compound shall be spread evenly over and extending slightly beyond the fill coat on all joints and feathered to a smooth, uniform finish. Over tapered edges, the finished joint shall not protrude beyond the plane of the surface. All taped angles shall receive a finish coat to cover the tape and taping compound, and provide a true angle. Where necessary, sanding shall be done between coats and following the final application of compound to provide a smooth surface, ready for painting.
- D. Fastener Depressions: Compound shall be applied to all fastener depressions followed, when hardened by at least two (2) coats of compound, leaving all depressions level with the plane of the surface.
- E. Finishing Beads and Trim: Compound shall be applied to all bead and trim and shall be feathered out from the ground to the plane of the surface. When hardened, this shall be followed by two (2) coats of compound each extending slightly beyond the previous coat. The finish coat shall be feathered from the ground to the plane of the surface and sanded as necessary to provide a flat, smooth surface ready for decoration.
- F. Finishing level will be Level 5 of ASTM C 840 and GA-214 of the Gypsum Association as shown on the drawings and at all gypsum board walls or ceilings which are to receive a three-coat paint system finish, at all double height spaces regardless of the finish paint type, and on the faces of soffits.
- G. Drywall construction with defects of such character which will mar appearance of finished work, or which is otherwise defective, will be rejected and shall be removed and replaced at no expense to the Owner.

### 3.9 CLEANING AND ADJUSTMENT

- A. At the completion of installation of the work, all rubbish shall be removed from the building leaving floors broom clean. Excess material, scaffolding, tools and other equipment shall be removed from the building.
- B. Work shall be left in clean condition ready for painting or wall covering. All work shall be as approved by Architect.
- C. Cutting and Repairing: Include all cutting, fitting and repairing of the work included herein in connection with all mechanical trades and all other trades which come in conjunction with any part of the work, and leave all work complete and perfect after all trades have completed their work.

# 3.10 PROTECTION OF WORK

A. Installer shall advise Contractor of required procedures for protecting drywall work from damage and deterioration during remainder of construction period.

**END OF SECTION** 

### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the ceramic tiling work as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Ceramic floor tile.

- 2. Ceramic wall tile and base.
- 3. Stone saddles.
- 4. Theater dressing room showers ceramic tile on waterproofing membrane and CMU; terrazzo shower base.
- 5. Setting beds, grout, sealant and waterproofing membrane.

## 1.3 RELATED SECTIONS

- A. Cast-in-Place Concrete Section 033000.
- B. Unit Masonry Section 042000.
- C. Gypsum Drywall Section 092900.

### 1.4 REFERENCES

- A. ANSI A108 Series/A118 Series American National Standards for Installation of Ceramic Tile.
- B. ANSI A136.1 American National Standards for Organic Adhesives for Installation of Ceramic Tile.
- C. ASTM C 144 Standard Specification for Aggregate for Masonry Mortar.
- D. ASTM C 150 Standard Specification for Portland Cement.
- E. TCNA Handbook for Ceramic, Glass and Stone Tile Installation; Tile Council of North America.
- F. ISO 13007 International Standards Organization; Classification for Grout and Adhesives.
- G. Large Format Tile (LFT): Tile 15" or larger in any direction and/or 144 sq. in. in size.

# 1.5 QUALITY ASSURANCE

- A. Qualifications of Installers: For cutting, installing and grouting of ceramic tile, use only thoroughly trained and experienced journeyman tile setters who are completely familiar with the requirements of this work, and the recommendations contained in the referenced standards, and the installers are Certified Ceramic Tile Installer (CTI) through the Ceramic Tile Education Foundation (CTEF) or Tile Installer Thin Set Standards (ITS) verification through the University of Ceramic Tile and Stone.
- B. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with the following:

- 1. Manufacture all ceramic tile in accordance with Standard Grade Requirements of ANSI A-137.1.
- 2. Install all ceramic tile in accordance with the recommendations contained in "Tile Council of North America Handbook for Ceramic, Glass, and Stone Tile Installation (TCNA)," latest edition.
- C. All surfaces shall have a minimum wet DCOF AcuTest value of 0.42.

## 1.6 SUBMITTALS

# A. Samples

- 1. Before any ceramic tile is delivered to the job site, submit to the Architect sample panels, approx. 12" x 12", mounted on hardboard back-up with selected grout color for each color and pattern of ceramic tile and grout specified.
- 2. Submit 6" length of stone saddles, trim and accessories .
- 3. Submit 12" x 12" samples of waterproofing membrane.
- B. Master Grade Certificates: Prior to opening ceramic tile containers, submit to the Architect a Master Grade Certificate, signed by an officer of the firm manufacturing the ceramic tile used, and issued when the shipment is made, stating the grade, kind of tile, identification marks for tile containers, and the name and location of the project.
- C. Technical Specifications: Provide for grout, tile, method of installation, mortars and membranes.

# D. Mock-Ups

- 1. At an area on the site where approved by the Architect, provide a mock-up ceramic tile installation.
  - a. Make the mock-up approximately 36" x 36" in dimension and 48" x 48" for large format tiles.
  - b. Provide one mock-up for each type, class, and color of installation required under this Section.
  - c. The mock-ups may be used as part of the Work, and may be included in the finished Work when so approved by the Architect.
  - d. Revise as necessary to secure the Architect's approval.
- The mock-ups, when approved by the Architect, will be used as datum for comparison with the remainder of the work of this Section for the purposes of acceptance or rejection.

3. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the work of this Section.

### 1.7 PRODUCT HANDLING

# A. Delivery and Storage

- 1. Deliver all materials of this Section to the job site in their original unopened containers with all labels intact and legible at time of use.
- 2. Store all materials under cover in a manner to prevent damage and contamination; store only the specified materials at the job site.
- B. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

# 1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. Maintain temperatures at not less than 50 deg. F. in tiled areas during installation and for 7 days after completion.

# PART 2 PRODUCTS

# 2.1 MANUFACTURERS OF TILE

- A. Basis of Design tiles are listed below and are used in the Finishes Color Schedule in the Architectural Drawings. Subject to compliance with requirements specified, other acceptable manufacturers are listed per type below.
- B. Provide tile as selected by the Architect, meeting these specifications. The Architect reserves the right to pick tile from any price group.
  - 1. T1: Mosa Tierra Maestricht; acceptable alternates: Stonepeak City 2.0 Asphalt, 8 x 48, Prospec Architecre Black 4 x 36.
  - 2. T2: Casalgrande Padana Unicolore; acceptable alternates: "Less" matte porcelain by Stone, Source, Mosa Maestricht 200V.

- 3. T3: Coverings ETC, Ego-Gres; acceptable alternates: AKDO Origina Black (matte) 2.5 dx 10.5, Stone Source Progetto L14, X-Black 4 x 6.
- 4. T4: Crossville Cross Colors LP; acceptable alternates: American Olean. Villeroy and Boch.
- 5. T5 T6: Crossville Cross Colors; acceptable alternates: VitrA Tile, American Olean.
- 6. T7: Daltile Keystones; acceptable alternates: VitrA Tile, American Olean...
- 7. T8: Daltile Permabrites; acceptable alternates: VitrA Tile, American Olean...
- 8. T9: Daltile Modern Dimensions base tile; acceptable alternates: VitrA Tile, American Olean...

# 2.2 FLOOR TILE

- A. Unglazed Porcelain Floor Tile (T1) (used as porcelain wall base)
  - Basis of Design Manufacturer: Mosa USA, 247 W 35<sup>th</sup> Street, 17<sup>th</sup> Floor, New York, NY 10001, Tel: 212-729-6332 <a href="https://www.mosa.com">www.mosa.com</a>
  - 2. Tile: Mosa Tierra Maestricht
  - 3. Sizes: 8" high x 48" long nominal and 4' high x 24" long nominal.
  - 4. Thickness: 1/2" nominal
  - 5. Finish: Matte
  - 6. Colors: 203V Absolute Black
  - 7. Patterns: As indicated on the drawings.
- B. Floor Tile (T2)
  - 1. Basis of Design Manufacturer: Casalgrande Padana
    - See Section 2.1.A for alternates.
  - 2. Tile: Casalgrande Padana Unicolore
  - 3. Sizes: 24" x 24" nominal
  - 4. Thickness: 3/8" nominal
  - 5. Finish: Matte

- 6. Colors: Bianco Assuloto
- 7. Patterns: As indicated on the drawings.
- C. Ceramic Floor Tile (T4)
  - Basis of Design Manufacturer: Crossville, Inc., Crossville, TN 38557, Tel: 931-484-2110, Fax: 931-456-2956, www.crossvilleinc.com
    - a. Acceptable Alternate: Dal-Tile Corporation, 7834 C.F. Hawn Freeway, Dallas, TX 75217, Tel: 800-933-TILE; "Porcealto" Porcelain Tile.
  - 2. Tile: Crossville Cross-Colors LP.
  - 3. Sizes: 12" x 12" and 4" x 12" bullnose.
  - 4. Thickness: 5/16".
  - 5. Finish: Cross-Sheen UPS.
  - 6. Colors: Crossville LA90 Granite Grey; Dal-Tile CD60 Grigio Elba DT.
  - 7. Patterns: As indicated on the drawings.
- D. Ceramic Floor Tile (T7)
  - Basis of Design Manufacturer: Crossville, Inc., Crossville, TN 38557, Tel: 931-484-2110, Fax: 931-456-2956, www.crossvilleinc.com
    - a. Acceptable Alternate: Dal-Tile Corporation, 7834 C.F. Hawn Freeway, Dallas, TX 75217, Tel: 800-933-TILE;
  - 2. Tile: Crossville Cross-Colors LP.
  - 3. Sizes: 12" x 12".
  - 4. Thickness: 5/16".
  - 5. Finish: Cross-Sheen UPS.
  - 6. Colors: LA88 Black Pearl
  - 7. Patterns: As indicated on the drawings.
- 2.3 WALL TILE
  - A. Porcelain Wall Tile (T3)
    - 1. Basis of Design Manufacturer: Coverings ETC, 7610 NE 4th Court, Miami, FL 33138, Tel: 305-757-6000 www.coveringsetc.com

2. Tile: Eco-Gres porcelain

3. Size: 3" x 6" nominal

4. Thickness: 1/4" nominal

5. Finish: Matte

6. Color: Belmont Black

7. Patterns: As indicated on the drawings.

# B. Ceramic Wall Tile (T5 - T6)

- Basis of Design Manufacturer: Crossville, Inc., Crossville, TN 38557, Tel: 931-484-2110, Fax: 931-456-2956, <a href="https://www.crossvilleinc.com">www.crossvilleinc.com</a>
  - a. Acceptable Alternate: Dal-Tile Corporation, 7834 C.F. Hawn Freeway, Dallas, TX 75217, Tel: 800-933-TILE; "Porcealto" Porcelain Tile.
- 2. Tile: Crossville Cross-Colors.
- 3. Size: 12" x 12" and 4" x 12".
- 4. Thickness: 5/16".
- 5. Finish: Cross-Sheen UPS.
- Colors: Crossville A215 Empress White and B230 Zeolite; Dal-Tile CD88 -Azzurite DT and CD80 - Diamante DT.
- 7. Patterns: As indicated on the drawings.

# 2.4 TRIM AND SPECIAL SHAPES

- A. Provide external and internal corners, trim shapes at openings, and all other trim and special shapes to match the tile specified herein, as required by field conditions and drawing details.
- B. Profiles and details shown on drawings are those of Schluter Systems (Basis of Design), unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are Blanke Corp. USA and Butech.
  - 1. Edge-Protection Trim: At exposed vertical edges of tile, provide the following:
    - a. 90-Degree Corner Trim: JOLLY by Schlüter (basis of design); black anodized aluminum.
    - b. 135-Degree Corner Trim: Deco-DE by Schlüter (basis of design); brushed stainless steel.

- c. 90-Degree Corner Trim: Schiene by Schlüter (basis of design); brushed stainless steel.
- d. Floor, wall and base tile movement joints by Schluter Systems, Butech.
  - 1). Basis of Design Floor Tile with Full Mortar Bed: Schluter DILEX-MP Floor, or similar product to fit in joint sizes shown on the drawings, in color selected by architect
  - 2). Basis of Design Wall and Base Tile, and Thin-set Floor Tile: Schluter Systems DILEX\_BWB, to match joint and tile size shown on drawings, in color selected by architect.
  - 3). Basis of Design Tile Base at Seismic Joint: Schluter Systems DILEX-BT anodized, extruded aluminum expansion joint

## 2.5 STONE SADDLES

- A. Provide dark grey slate, minimum 3/4" thick, with an abrasive hardness of not less than 10.0, when tested in accordance with ASTM C 241. Cut saddle to fit jamb profile, honed finish.
- 2.6 SETTING BEDS AND GROUT
  - A. Portland Cement: ASTM C 150, Type 1.
  - B. Hydrated Lime: ASTM C 207, Type S.
  - C. Sand: ASTM C 144, clean and graded natural sand.
  - D. Reinforcing for Mud Set Systems: 2" x 2" x 16/16 ga. welded wire mesh.
  - E. Latex Admixture for Mortar Bed
    - 1. MAPEI, Planicrete AC, blended with a 3:1 site mix.
    - 2. Laticrete 333.
    - 3. Pro Spec; Acrylic Additive.
    - 4. Custom Building Products; Custom Crete Thin Set Additive.
  - F. Latex-Portland Cement Bond Coat, complying with ANSI A118.4 and ISO 13007, C2ES2P2 with minimum compressive strength of 400 psi.
    - 1. MAPEI, Keralastic System thin set mortar, consisting of Kerabond dry-set mortar and Keralastic latex admixture.
    - 2. Laticrete; 211 dry-set mortar and 4237 latex admixture.
    - 3. Pro Spec; Permalastic System consisting of Permalastic Dryset Mortar and Permalastic Admixture

- 4. Custom Building Products; Pro-Lite.
- G. Improved Modified Cement Mortars: For use with LFT, complying with ANSI 118.15 and ISO 13007, CSES2PS.
  - 1. Custom Building Products; Mega-Lite Crack Prevention Mortar (650-725 psi).
  - 2. Laticrete; 220 Marble Granite Mortar (500-540 psi).
  - 3. Mapei; Kerabond T Keralastic (400-600 psi).
  - 4. Pro Spec; StayFlex 590 (460 psi).
- H. Wall and Base Tile
  - 1. Over drywall, use ANSI A136.1-1967 Organic Adhesive for installation of Ceramic Tile, Type I and ISO 13007 D2TE. Shear strength shall be 50 psi minimum. Adhesive primer as recommended by adhesive manufacturer. Manufacturer shall certify, in writing, that adhesive and primer used are proper types for the intended tile types and application. Conform to TCA Detail W-242.
    - a. MAPEI Type 1 Mastic.
    - b. Laticrete Type 1 Adhesive.
    - c. ProSpec B-1000 Tile Adhesive.
    - d. Custom Building Products' Reliabond Adhesive Type 1.
  - Over masonry and concrete, use a mortar bed leveling coat conforming to ANSI A108.1A followed by a Latex Portland Cement Bond Coat, (basis of design) MAPEI, Kerabond/Keralastic System, Custom Mega Flex subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-211.
  - Over cement board, use a Latex Portland cement mortar bond coat, MAPEI, Kerabond/Keralastic System, Custom Mega Flex subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-244; coat back of board with waterproof membrane as specified below.
  - 4. Over glass mat water resistant gypsum backer board, use a Latex Portland cement mortar bond coat, MAPEI, Kerabond/Keralastic System, subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail W-245.
- I. Floor Tile and Stone Saddle Mud Set: Set floor tile and stone saddle using Portland Cement mortar setting bed conforming to ANSI A108.1A and latex modified Portland

cement bond coat. Basis of Design: Mapei, Kerabond/Keralastic System, subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail F-112.

- For installation of LFT, Improved Modified Cement Mortars and medium bed; Basis of Design: Custom Building Products, MegaLite Crack Prevention Medium Bed Mortar subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI 118.15, ISO 13007-C2ES2P2.
- J. Floor Tile and Stone Saddle Thin Set: Set floor tile and stone saddle using latex modified Portland Cement mortar, Basis of Design, Mapei, Kerabond/Keralastic System subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and TCA Detail F-113.
  - For installation of LFT, Improved Modified Cement Mortars and medium bed; Basis of Design: Custom Building Products, MegaLite Crack Prevention Medium Bed Mortar subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI 118.15, ISO 13007-C2ES2P2.
- K. Floor Tile and Stone Saddle Waterproof Setting Bed: Set floor tile and stone saddle using thin set latex Portland cement bond coat, Basis of Design: Mapei, Kerabond/Keralastic System, subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI A118.4, ISO 13007-C2ES2P2, and waterproofing membrane conforming to TCA Detail F-122/122A. Use this system where toilet room occurs over occupied space other than another toilet room and wherever else noted on drawings.
  - For installation of LFT, Improved Modified Cement Mortars and medium bed; Basis of Design: Custom Building Products, MegaLite Crack Prevention Medium Bed Mortar subject to compliance with requirements specified other acceptable manufacturers are by Laticrete or Pro Spec, conforming to ANSI 118.15, ISO 13007-C2ES2P2.
- L. On ground tile setting for Student Center Floors, use TCA F111-16, unbounded mortar bed with cleavage membrane.
- M. Waterproofing Membrane: Complying with ANSI A118.10 and ANSI A118.12; and having IAPMO certification as a shower pan liner; provide "Mapelastic 400" by Mapei with factory blended "Bio-Block" antimicrobial protection, "Laticrete 9235 with Mircoban" made by Laticrete International, ProSpec "B6000," Custom Building Products' "9240,".
  - 1. Reinforce membrane with polyester fabric.

- N. Water: Clean, fresh and suitable for drinking.
- O. Grout: Complying with A118.7; and ISO 13007, CG2WAF; provide unsanded grout; Bostik's "Dimension Series" pre-mixed, unsanded, urethane grout. Color of grout shall match tile color.
- P. Provide unsanded grout for all rectified large and small format tiles to be set with tight joints (1/16" and 1/8"), Butech.
- Q. Physical Properties: The setting beds and grouts must meet the following physical requirements:
  - 1. Compressive Strength: 3000 psi min.
  - 2. Shear Bond Strength: 500 psi min.
  - 3. Water Absorption: 4.0% max.
  - 4. Service Rating (ASTM C 627): Extra Heavy Duty.
- R. Sealer: Seal all grout joints and all unglazed tile using "Sealer's Choice 15 Gold" as manufactured by Aqua Mix Inc..
- S. Temporary Protective Coating: Either product indicated below that is applied in the tile manufacturer's factory and formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
  - 1. Petroleum paraffin wax, applied hot, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg. F. per ASTM D 87.
  - 2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- T. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

# 2.7 SEALANT

- A. Joint Backing: Preformed, compressible, resilient, non-extruding, non-staining strips of foam neoprene, foam polyethylene, or other material recommended by sealant manufacturer.
- B. Bond Breaker: Polyethylene tape, 3 mils thick, or other material recommended by sealant manufacturer.

- C. Sealant Primer: Colorless, non-staining, or type to suit substrate surface, as recommended by sealant manufacturer.
- D. Sealant: One-part silicone based sanitary sealant, conforming to ASTM C 920, Type S, Grade NS, Class 25. Sealant hardness upon full cure shall be between 20-30 Shore "A" Durometer. Color of sealant to blend with or match adjacent materials, and as selected by the Architect. Sealant shall be equivalent to 1700 Sanitary Sealant made by General Electric.

# PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where ceramic tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 CONDITION OF SURFACES

- A. Allowable Variations in Substrate Levels in Floors: + 1/8" in 10'-0" distance and 1/4" total max. variation from levels shown.
- B. Grind or fill concrete and masonry substrates as required to comply with allowable variations.
- C. Concrete substrates must meet ANSI A108.01 tolerances and surface textures in preparation for tile work. Coordinate with concrete trades.

## 3.3 PREPARATION

- A. Coordinate the following with Section 033000:
  - Steel trowel and fine broom finish concrete slabs that are to receive ceramic tile. Cure concrete slabs that are to receive tile before tile application. Do not use liquid curing compounds or other coatings that may prevent bonding of tile setting materials to slabs. Slab shall be dry at time of tile installation.
  - 2. Tile floors with floor drains must have a slope to direction of ¼" per foot; coordinate this with concrete trades.
- B. Etch concrete substrate as may be required to remove curing compounds or other substances that would interfere with proper bond of setting bed. Rinse with water to remove all traces of treatment.
- C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as

- those taken from other packages and match approved samples. If not factory blended, either return to manufacturer or blend tiles at project site before installing.
- D. Field Applied Temporary Protective Coating: Pre-coat tile with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

# 3.4 JOINTS IN TILE WORK

- A. Joint Widths: 1/16" wide in ceramic tile unless otherwise noted on drawings.
- B. Alignment: Wall, base and floor joints shall align through the field and trim. Direction and location of all joints as directed by Architect.
- C. Movement Joints: Conform to TCA Detail EJ171. Locate where movement joints are in back-up material. Provide movement joint at joints between mop receptors and ceramic tile. Provide movement joint at all vertical internal joints of wall tile. Movement joints 1/8" wide in ceramic tile. Fill all movement joints with specified backing and sealant. Use bond breaker where sufficient space for joint backing does not exist.
  - 1. Provide sealant between ceramic tile and plumbing fixtures, mirrors, pipes, countertops and other dissimilar materials penetrating or adjacent to ceramic tile.

# 3.5 INSTALLATION

- A. Comply with the following installation standards:
  - 1. Wall tile over drywall using organic adhesive ANSI A136.1 and ISO 13007, D2TE.
  - 2. Wall tile over cement board or glass mat backer board using dry set mortar with latex additive ANSI A118.4 and ISO 13007. C2ES2P2.
  - 3. Wall tile over masonry or concrete using dry set mortar with latex additive ANSI A118.4 and ISO 13007, C2ES2P2.
  - 4. Floor tile using full mud set mortar ANSI A118.4, A228.15, and ISO 13007, C2ES2P2.
  - 5. Floor tile using dry set mortar with latex additive ANSI A118.4, A118.15, and ISO 13007, C2ES2P2.
  - 6. Floor tile over waterproofing membrane ANSI A118.4, 118.5, and ISO 13007, C2ES2P2.
  - 7. Floor tile over mortar bed with cleavage membrane ANSI A118.4 and ISO 13007, C2ES2P2.

- B. Backs of tile must be cleaned before installation.
- C. All setting beds and/or adhesives shall provide for an average contact area of not less than 95% coverage.
- D. Allowable Variations in Finished Work: Do not exceed the following deviations from level and plumb, and from elevations, locations, slopes and alignment shown.
  - 1. Floors: 1/8" in 10'-0" run, any direction; +/- 1/8" at any location; 1/32" offset at any location.
  - 2. Walls: 1/8" in 8'-0" run, any direction; 1/8" at any location; offset at any location, 1/32".
  - 3. Joints: +/- 1/32" joint width variation of any location; 1/16" in 3'-0" run deviation from plumb and true.

# E. Waterproofing Membrane

- 1. Install the membrane in strict accordance with manufacturer's written recommendations.
- Upon completion of work, test horizontal membrane for leaks by flood testing per ASTM D 5957. Inspect for leakage. Make necessary adjustments to stop all leakage and retest until watertight. If membrane is not immediately covered by another surface, provide protection until membrane is covered.
- F. Handle, store, mix and apply setting and grouting materials in compliance with the manufacturer's instructions.
- G. Extend tile work into recesses and under equipment and fixtures, to form a complete covering without interruptions. Terminate work neatly at obstructions, edges and corners without disruption of pattern or joint alignment.
- H. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or builtin items for straight, aligned joints. Fit tile closely to electrical outlets, piping and fixtures so that plates, collars, or covers overlap tile.
- I. Lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are the same size. Lay out tile work and center tile fields both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths.

# 3.6 INSTALLATION OF STONE SADDLES

A. Install stone saddles cut to profiles and sizes shown, accurately fitted to jambs, coped at stops, set in full bed of mortar herein specified, and with grouted edge joints as specified for floor tile.

### 3.7 CLEANING AND PROTECTION OF CERAMIC TILE

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
  - 1. Remove grout residue from tile as soon as possible.
  - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use cleaners only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning to insure removal of all cleaning material.
  - 3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.
- B. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. Apply coat of sealer to all grout joints and all unglazed tile.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- D. Before final inspection, remove protective coverings from tile surfaces.
- E. Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.

**END OF SECTION** 



#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

## A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the acoustical panel ceilings as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Acoustical panel units.

- 2. Exposed and concealed suspension systems, including hangers and inserts.
- 3. Provisions for the installation of lighting fixtures, diffusers, grilles and similar items provided under other Sections.
- 4. Cutting, drilling, scribing and fitting as required for electro-mechanical penetrations.
- 5. Perimeter and column moldings, trim and accessories for acoustical ceilings.

## 1.3 RELATED SECTIONS

- A. Steel Deck Section 053100.
- B. Drywall ceilings Section 092900.
- C. Diffusers, grilles and related frames Division 23.
- D. Lighting fixtures Division 26.

# 1.4 QUALITY ASSURANCE

A. Codes and Standards: In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations published by the Ceilings and Interior Systems Contractor's Association.

# B. Qualifications of Installers

- The suspended ceiling subcontractor shall have a record of successful installation of similar ceilings acceptable to Architect and shall be currently approved by the manufacturer of the ceiling suspension system.
- 2. For the actual fabrication and installation of all components of the system, use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.
- C. The work is subject to the following standards:
  - 1. ASTM C 635 "Standard Specification for Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings," American Society for Testing and Materials.
  - 2. ASTM C 636 "Standard Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels," American Society for Testing and Materials.
- D. In addition to suspension system specified, provide seismic struts and seismic clips to meet seismic standards as required by prevailing Codes and Ordinances.

# 1.5 SUBMITTALS

- A. Shop Drawings: Submit completely dimensioned ceiling layouts for all areas where acoustical ceilings are required, showing:
  - 1. Any deviations from Architect's reflected ceiling plan layouts, especially lighting fixture and dimensions. Also indicate if any light fixtures will not fit into Architect's ceiling layout due to dimensional restrictions or field conditions.
  - 2. Direction and spacing of suspension members and location of hangers for carrying suspension members.
  - 3. Direction, sizes and types of acoustical units, showing suspension grid members, and starting point for each individual ceiling area.
  - 4. Moldings at perimeter of ceiling, at columns and elsewhere as required due to penetrations or exposure at edge of ceiling tiles.
  - 5. Location and direction of lights, air diffusers, air slots, and similar items in the ceiling plane. Show coordination of light, air diffusers or other equipment in terms of edge or suspension trim required for compatibility with the ceiling suspension hardware.
  - 6. Details of construction and installation at all conditions.
  - 7. Materials, gauges, thickness and finishes.
- B. Samples and Product Literature: Submit the following samples and related manufacturer's descriptive literature.
  - 1. Twelve (12) inch long components of suspension systems, including moldings.
  - 2. Acoustical units full size.

# 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination or other causes.
- B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- C. Handle acoustical ceiling units carefully to avoid chipping edges or damaging units in any way.

### 1.7 PROJECT CONDITIONS

- A. Do not install acoustical ceilings until wet-work in space is completed and nominally dry, work above ceilings has been completed, and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.
- B. A pre-construction conference will be required prior to the installation of the ceiling of the Dining Room to insure coordination of the lighting installation with the ceiling panel to maintain the design requirements of the ceiling.

### 1.8 COORDINATION

A. Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by or penetrating through ceilings, including light fixtures, HVAC equipment, fire suppression system components, and partition system.

# 1.9 EXTRA STOCK

- A. Extra Stock: Deliver stock of maintenance material to Owner. Furnish maintenance material matching products installed, packaged with protective covering for storage and identified with appropriate labels.
  - 1. Acoustical Ceiling Units: Furnish quantity of full size units equal to 2.0% of amount installed.

# PART 2 PRODUCTS

# 2.1 ACOUSTICAL UNITS

- A. Large Format Acoustical Panels: Profiles and details shown on the drawings are those of "Lyra Concealed" by Armstrong World Industries (Basis of Design) unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are Decoustics "Claro" and Ecophon "Focus Dg", provide 7/8" thickfiberglass panels "Lyra Concealed" with quick kerf edge, as manufactured by Armstrong World Industries, made by CertainTeed, Decoustics,. Panels shall have factory applied white finish with light reflectance value of 0.90, and a minimum NRC of 0.90. Panels shall meet ASTM E 1264, Type XII, Form 2, Pattern E, Class A, with minimum flame spread of 25 and smoke developed of 50 per ASTM E 84.
  - Suspension System: Provide concealed steel suspension system with low sheen white baked enamel finish equal to "Prelude," 15/16" concealed tee 2-way grid system made by Armstrong World Industries, by USG Interiors, Inc. or Chicago Metallic Corp.

- B. Acoustical Plank, High NRC: Profiles and details shown on the drawings are those of "Lyra" in a "TechZone" installation with coordination of lighting and air distribution by Armstrong World Industries (Basis of Design) unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are USG Halcyon Logix and Certainteed Performa Symphony f, provide 1" thick fiberglsas panels equal to "Lyra," with square tegular edge, as manufactured by Armstrong World Industries, by CertainTeed, USG Interiors, Inc. Panels shall have factory applied white finish with light reflectance value of 0.88, and a minimum NRC of 0.95. Panels shall meet ASTM E 1264, Type XII, Form 2, Pattern E, Class A, with minimum UL flame spread of 25 and smoke developed of 50 per ASTM E 84.
  - Suspension System: Provide teguar 9/16" dimensional tee system "Interlude XL," as manufactured by Armstrong World Industries, subject to compliance with specified requirements, other acceptable manufacturers are USG Commercial Ceilings or Chicago Metallic Corp. Color: "Blizzard White."
- C. Acoustical Panels for Kitchen: Provide 1" thick smooth textured panel meeting USDA/FSIS guidelines for use in food preparation areas and kitchens, that is washable and cleanable, and has mold/mildew and bacterial inhibitors, "Ultima Health Zone" by Armstrong, subject to compliance with specified requirements, other acceptable manufacturers are USG Clean Room Acoustical Ceiling or Certainteed Performa Rx Symphony f, with beveled tegular edge for use with "Interlude" suspension system, color "Blizzard White."

# 2.2 SUSPENSION SYSTEM

- A. The suspension system shall support the ceiling assembly shown on the drawings and specified herein, with a maximum deflection of 1/360 of the span, in accordance with ASTM C 635.
- B. Provide min. 12 ga. galvanized wire hangers, soft annealed steel conforming to ASTM A 641, prestretched, Class 1 zinc coating, soft temper, size so that stress at 3 times hanger design load (ASTM C 635, Table 1, Direct Hung) will be less than yield stress of wire.
- C. Provide ceiling clips and inserts to receive hangers, type as recommended by suspension system manufacturer, sizes for pull-out resistance of not less than five (5) times the hanger design load, as indicated in ASTM C 635.
- D. Suspension systems shall conform to ASTM C 635, intermediate duty.
- E. Provide manufacturer's standard wall moldings with off-white baked enamel finish to match suspension systems. For circular penetrations of ceilings, provide edge moldings fabricated to diameter required to fit penetration exactly.
- F. Provide finishing trim for ceiling edge as shown on Arch Dwgs. Profile shown on the drawings an details is Gordon Interior Specialties Wall Angle Profile WS-1010. Subject

to compliance with the requirements specified, other acceptable manufacturers are Pittcon Softforms and Fry Reglet

# PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas where acoustical panel ceilings are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected to permit proper installation of the layout.

# 3.2 PREPARATION

- A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.

### 3.3 INSTALLATION

- A. In the Dining Room and Servery ceilings, no panels shall be cut to fit from the specified sizes. All panels shall remain full units, integrated with diffusers and lights without any modification to manufactured size.
- B. In laying out the ceiling, insure that drywall borders, soffits or other constraining conditions surrounding panel ceilings are not located so as to require acoustic panel or plank size modifications.
- C. Codes and Standards: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations and industry standards.
- D. Install suspension systems to comply with ASTM C 636, with wire hangers supported only from building structural members. Locate hangers not more than 6" from each end and spaced 4'-0" along direct-hung runner, leveling to tolerance of 1/8" in 12'-0".
- E. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperatures.
- F. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, reinforcing, countersplaying or other equally effective means.

- G. Install edge moldings at edges of each acoustical ceiling area, and at locations where edge of acoustical units would otherwise be exposed after completion of the work.
  - 1. Secure moldings to building construction by fastening through vertical leg. Space holes not more than 3" from each end and not more than sixteen (16) inches o.c. between end holes. Fasten tight against vertical surfaces.
  - 2. Level moldings with ceiling suspension system, to a level tolerance of 1/8" in 12'-0".
- H. Install acoustical units in coordination with suspension system, with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
- I. Install hold-down clips in toilet areas, and in areas where required by governing regulations; space 2'-0" o.c. on all cross tees.
- J. Light fixtures or other ceiling apparatus shall not be supported from main beams or cross tees if their weight causes the total load to exceed the deflection capability of the ceiling suspension system. In such cases the load shall be supported by supplemental hangers furnished and installed by this Section of work.
- K. Where fixture or ceiling apparatus installation causes eccentric loading on runners, provide stabilizer bars to prevent rotation.

### 3.4 ADJUST AND CLEAN

A. Clean exposed surfaces of acoustical ceilings, including trim, edge molding, and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work which cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**END OF SECTION** 



# 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the resilient accessories, as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Rubber base.

- 2. Rubber stair treads.
- 3. Accessories.

### 1.3 RELATED SECTIONS

- A. Gypsum Drywall Section 092900.
- B. Resilient Tile Flooring Section 096519.
- C. Carpet Tile Section 096813.

#### 1.4 QUALITY ASSURANCE

A. Qualifications of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

## 1.5 SUBMITTALS

A. Manufacturer's Data: For information only, submit manufacturer's technical information and installation instructions for type of resilient base.

## B. Samples

- 1. Submit six (6) inch long samples of base.
- 2. Submit full-size sample of stair tread.

### 1.6 DELIVERY AND STORAGE

- A. Deliver materials to the project site in the manufacturer's original unopened containers, clearly marked to indicate pattern, gauge, lot number and sequence of materials.
- B. Carefully handle all materials and store in original containers at not less than seventy (70) degrees F. for at least forty-eight (48) hours before start of installation.

# 1.7 JOB CONDITIONS

A. Continuously heat spaces to receive base to a temperature of seventy (70) degrees F. for at least forty-eight (48) hours prior to installation, whenever project conditions are such that heating is required. Maintain seventy (70) degrees F. temperature continuously during and after installation as recommended by the manufacturer, but for not less than forty-eight (48) hours. Maintain a temperature of not less than fifty-five (55) degrees F. in areas where work is completed.

#### PART 2 PRODUCTS

#### 2.1 RUBBER BASE

A. Provide 6" high by 1/8" thick continuous vulcanized SBR rubber top set cove base with pre-formed internal and external corner pieces, color as scheduled. For areas to receive carpet, provide flat base, no cove. Base shall conform to ASTM F 1861, Type TS, Group 1 (solid) as manufactured by Armstrong, Roppe, Johnsonite, or approved equal.

#### 2.2 STAIR TREADS

A. Basis of Design: Provide Johnsonite "Visually Impaired" rubber stair treads with integrated riser, square pattern, Subject to compliance with requirements specified, other acceptable manufacturers are Roppe and Expanko Resilient Flooring, conforming to ASTM F 1344, Class 1. Treads shall be 3.2mm thick, in lengths and depth to fit tread of stair. Nosings shall be square, adjustable to fit angle of stair nosing, 1-9/16" height. Color shall be as scheduled on the drawings. Leading edge of tread shall have a contrasting color strip embedded flush with tread and heat welded.

#### 2.3 ACCESSORIES

- A. Adhesives: Waterproof, stabilized type, as recommended by the manufacturer for the type of service indicated.
- B. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.
- C. Concrete Slab Primer: Non-staining type recommended by the tile manufacturer.
- D. Leveling Compound: Latex/Portland cement flash patching and leveling compound equal to No. DSP-520 made by H.B. Fuller or No. 226 with 3701 admixture made by Laticrete or Mapei..

### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where resilient base is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 INSTALLATION

A. Bases: In all spaces where base is indicated, install bases tight to walls, partitions, columns, built-in cabinets, etc., without gaps at top or bulges at bottom, with tight joints

and flush edges, with molded corner pieces at internal and external corners. Provide end stops adjacent to flush type door frames and where base does not terminate against an adjacent surface. Keep base in full contact with walls until adhesive sets.

#### B. Stair Treads

- 1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
- 2. Tightly adhere to substrates throughout length of each piece.
- 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

#### 3.3 CLEANING AND PROTECTION

A. Remove any excess adhesive or other surface blemishes from base using neutral type cleaners as recommended by the manufacturer.

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the resilient tile flooring in the floor, risers, riser faces and stepped aisles of the theater, as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Rubber tile.

- 2. Rubber treads with integral riser.
- 3. Solid vinyl tile.
- Adhesive.
- 5. Accessories.

#### 1.3 RELATED SECTIONS

A. Resilient Base and Accessories - Section 096513.

#### 1.4 QUALITY ASSURANCE

A. Qualifications of Installers: Use only personnel who are thoroughly trained and experienced in the skills required and completely familiar with the requirements established for this work.

## 1.5 SUBMITTALS

- A. Manufacturer's Data: For information only, submit manufacturer's technical information and installation instructions for type of resilient tile.
- B. Samples: Submit full-size sample tiles for each type and color required, representative of the expected range of color and pattern variation. Sample submittals will be reviewed for color, texture and pattern only. Compliance with all other requirements is the exclusive responsibility of the Contractor.
- C. Submit manufacturer's warranty as noted herein.

### 1.6 DELIVERY AND STORAGE

- A. Deliver materials to the project site in the manufacturer's original unopened containers, clearly marked to indicate pattern, gauge, lot number and sequence of materials.
- B. Carefully handle all materials and store in original containers at not less than seventy (70) degrees F. for at least forty-eight (48) hours before start of installation.

## 1.7 FIELD CONDITIONS

- A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F. or more than 95 deg F., in spaces to receive floor tile during the following time periods:
  - 1. 48 hours before installation.
  - 2. During installation.
  - 3. 48 hours after installation.

- B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F. or more than 95 deg F.
- C. Close spaces to traffic during floor tile installation.
- D. Close spaces to traffic for 48 hours after floor tile installation.
- E. Install floor tile after other finishing operations, including painting, have been completed.

## 1.8 WARRANTY

A. Provide manufacturer's 5-year limited warranty.

#### PART 2 PRODUCTS

## 2.1 RUBBER TILE

- A. Provide 24" x 24" x 1/8" thick rubber tile with integral cork. Basis of Design: "Corktones Rubbber Tile Flooring" in leather texture as manufactured by Johnsonite, or comparable product of Expanko or Roppe conforming to ASTM 1344, Class 1, Type A in color and finish as scheduled on the drawings.
- B. Provide 1/8" thick rubber tread with integral riser and visually impaired strip at tread edge. Basis of Design: Johnsonite "Corktones" in leather texture, or comparable product as manufactured by Expanko or Roppe conforming to ASTM 1344, Class 1, Type A in color and finish as scheduled on the drawings.

## 2.2 SOLID VINYL TILE (SVT)

A. Provide 18" x 18" x 1/8" thick solid vinyl tile conforming to ASTM F1700 in colors selected by Architect and indicated on drawings. Basis of design is Johnsonite Tarkett "Cortina Grande - the Azrock Collection" or comparable product by Armstrong or Roppe.

#### 2.3 ACCESSORIES

- A. Adhesives: Waterproof, stabilized type, as recommended by the tile manufacturer for the type of service indicated.
- B. Concrete Slab Primer: Non-staining type recommended by the tile manufacturer.
- C. Leveling Compound: Latex/Portland cement flash patching and leveling compound No. DSP-520 made by H.B. Fuller or No. 226 with 3701 admixture made by Laticrete or made by Mapei.

D. Edging Strips at Seat Riser Locations: 1/8" thick, homogeneous rubber composition, tapered or bullnose edge, color as selected by the Architect from manufacturer's standards.

#### F. Finish for SVT

- 1. Cleaner: Product recommended in SVT manufacturer's published literature.
- 2. Wax: Product recommended in SVT manufacrturer's published literature.

#### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where resilient tile flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 CONDITION OF SURFACES

- A. Allowable Variations in Substrate Levels (Floors): ± 1/8" in 10'-0" distance and 1/4" total maximum variation from levels shown.
- B. Grind or fill concrete substrates as required to comply with allowable variation.

#### 3.3 PREPARATION

- A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.
- B. Concrete Substrates: Prepare according to ASTM F 710.
  - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
  - 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
  - 3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
  - 4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

- a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb. of water/1000 sq. ft. in 24 hours.
- b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum **75** percent relative humidity level.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- Do not install floor tiles until they are the same temperature as the space where they are to be installed.
  - 1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.
- E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

## 3.4 INSTALLATION

- A. Install tile only after all finishing operations, including painting, have been completed and permanent heating system is operating. Moisture content of concrete slabs, building air temperature and relative humidity must be within limits recommended by tile manufacturer.
- B. Place tile units with adhesive cement in strict compliance with the manufacturer's recommendations. Butt tile units tightly to vertical surfaces, thresholds, nosings and edgings. Scribe around obstructions and to produce neat joints, laid tight, even and in straight, parallel lines. Extend tile units into toe spaces, door reveals, and into closet and similar openings.
- C. Maintain reference markers, holes, or openings that are in place or plainly marked for future cutting by repeating on the finish tile as marked in the subfloor. Use chalk or other non-permanent marking devices.
- D. Lay tile from center marks established with principal walls, discounting minor off-sets, so that tile at opposite edges of the room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.
- E. Match tiles for color and pattern by using tile from cartons in the same sequence as manufactured and packaged. Cut tile neatly to and around all fixtures. Broken, cracked, chipped or deformed tile is not acceptable.

- F. Tightly cement tile to sub-base without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks through tile, or other surface imperfections.
- G. Place resilient edge strips tightly butted to tile and secure with adhesive. Provide edging strips at all unprotected edges of tile, unless otherwise shown.

## 3.5 CLEANING AND PROTECTION

- A. Remove any excess adhesive or other surface blemishes from tile, using neutral type cleaners as recommended by the tile manufacturer. Protect installed flooring from damage by use of heavy Kraft paper or other covering.
- B. Finishing: After completion of the project and just prior to the final inspection of the work, thoroughly clean tile floors and accessories.
  - 1. SVT: Apply two (2) coats of wax and buff using materials as specified herein.

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the resinous flooring and base for mechanical equipment rooms and elsewhere as noted on the drawings.

## 1.3 RELATED SECTIONS

A. Cast-in-Place Concrete - Section 033000.

B. Floor drains - Division 22.

## 1.4 SUBMITTALS

- A. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors and finishes available.
  - 1. Submit three (3) 2-1/2" x 4" samples of each material specified herein with color from color chart selection designated by the Architect.
- B. Material certificates signed by manufacturer certifying that the composition flooring complies with requirements specified herein.
- C. Maintenance written instructions for recommended maintenance practices.

### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer or applicator who has specialized in installing flooring types similar to that required for this Project and who is acceptable to manufacturer of primary materials.
- B. Single-Source Responsibility: Obtain resinous flooring materials, including primers, resins, hardening agents, and finish or sealing coats, from a single manufacturer.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name and directions for storage and mixing with other components.
- B. Store materials to comply with manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

## 1.7 PROJECT CONDITIONS

A. Environmental Conditions: Comply with resinous flooring manufacturer's directions for maintenance of ambient and substrate temperature, moisture, humidity, ventilation, and other conditions required to execute and protect Work.

#### 1.8 WARRANTY

A. Provide manufacturer's warranty with flashing endorsement, signed by Applicator and authorized representative of manufacturer, and warranting flooring materials against failures resulting from normal exposure for a period of three (3) years.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Subject to compliance with the requirements of this specification, resinous flooring shall be:
  - Basis of Design product is Silikal R61 CQM, methyl methacrylate resin quartz flooring; Subject to compliance with requirements specified, other acceptable manufacturers are SIKA and BASF.
- B. Silikal R61 CQM is a 4 to 6mm (3/16" to 1/4") thick troweled surfacing composite of 100% reactive binder resin and colored quartz aggregate with specified primer, membrane and topcoat.
  - 1. Moisture Vapor Treatment (if required): Silikal RE40.
  - 2. Saturating Primer Coat: Silikal R41 with Additive I.
  - 3. Patching/Sloping (if required): Silikal R17 Polymer Concrete.
  - 4. Flexible Membrane: Silikal RU320.
  - 5. Coving (if required): Silikal HK20 with Silikal filler CQ.
  - 6. Topping: Silikal R61 Quartz, consisting of Silikal R61 resinand Silikal Filler.
  - 7. Topcoat(s): Silikal R81 Colorless Silikal Topcoat Resin.
  - 8. Silikal CQ for Broadcasting: Color(s) as selected by the Architect.
- C. The finished Silikal floor coating system shall be uniform in color combinations, texture, and appearance. All edges that terminate at walls, floor discontinuities, and other embedded items shall be sharp, uniform, and cosmetically acceptable, with no thick or ragged edges. The Contractor shall work out an acceptable masking technique to ensure the acceptable finish of all edges.

## PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where resinous flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

## 3.2 PREPARATION

- A. Substrate: Perform preparation and cleaning procedures according to flooring manufacturer's instructions for particular substrate conditions involved, and as specified. Provide clean, dry, and neutral substrate for flooring application.
- B. Concrete Surfaces: Shot-blast, acid etch or power scarify as required to obtain optimum bond of flooring to concrete. Remove sufficient material to provide a sound surface free of laitance, glaze, efflorescence, and any bond-inhibiting curing compounds or form release agents. Remove grease, oil, and other penetrating contaminants. Repair damaged and deteriorated concrete to acceptable condition. Leave surface free of dust, dirt, laitance, and efflorescence.
- C. Materials: Prepare materials according to flooring system manufacturer's instructions.
- D. Starting of work implies acceptance of substrate.

### 3.3 APPLICATION

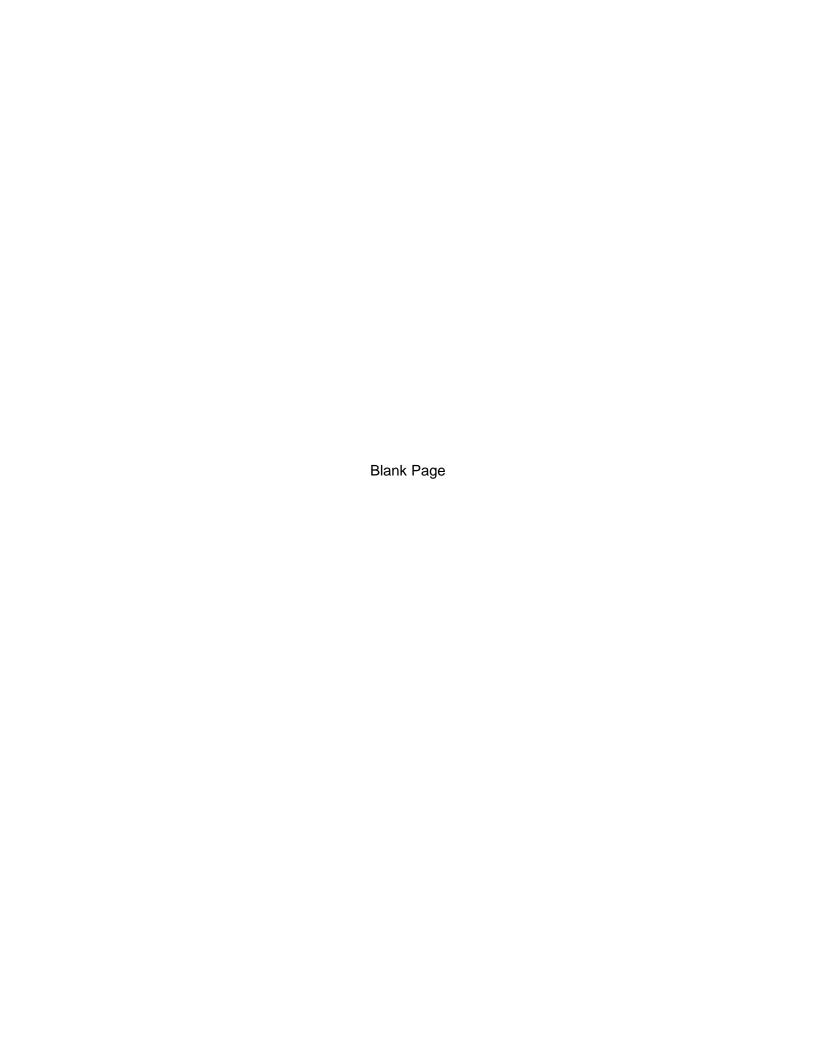
- A. General: Apply each component of resinous flooring system according to manufacturer's directions to produce a uniform monolithic flooring surface at the nominal thickness required.
  - 1. Start installation of flooring only in presence of manufacturer's technical representative who must approve (in writing to the Architect) condition of the prepared floor slab.
- B. Flooring system shall include the following minimum applications:
  - 1. Detail all cracks and control joints according to manufacturer's requirements.
  - 2. Moisture vapor treatment shall be Silikal RE40; application rate shall be approximately 220 sq. ft. per gallon (approx. 7 mils).
  - 3. Primer shall be Silikal R41 with Additive I; application rate shall be approx. 100 sq.ft. per gallon (approx. 16 mils).
  - 4. Patching/Sloping material shall be R17.
  - 5. Coving shall be Silikal HK 20 per manufacturer's recommendations.
  - 6. Body coat shall be Silikal R61 Quartz, applied with a gauge rake set at 1/8" for a rate of 40 sq. ft. per batch.
  - 7. Clear topcoat shall be Silikal R81; apply at the rate of 80 90 sq. ft. per gallon for the first coat and 100 125 sq. ft. per gallon for the second application.

## 3.4 TESTING

A. Test installation for leaks immediately after nominal cure of the completed flooring. Flood each area to a depth of one inch for 24 hours. Repair all leaks and repeat test until no leakage is observable.

# 3.5 CURING, PROTECTION AND CLEANING

A. Cure resinous flooring materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process. Close application area for a minimum of 24 hours.



#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the elastomeric liquid flooring, including but not limited to the following:
  - Elastomeric liquid flooring at Commons Servery and in corridor and lounge spaces.

## 1.3 RELATED SECTIONS

- A. Cast-in-Place Concrete Section 033000.
- B. Cement Leveling Compound Section 035416.

#### 1.4 SUBMITTALS

- A. Samples for initial selection purposes in form of manufacturer's color charts showing full range of colors and finishes available.
  - 1. Submit three (3) 2-1/2" x 4" samples of each material specified herein with custom color mix as selected by the Architect.
- B. Material certificates signed by manufacturer certifying that the composition flooring complies with requirements specified herein.
- C. Maintenance written instructions for recommended maintenance practices.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: installation should be done by installers certified by the flooring manufacturers, who are trained and experienced in the installation of this flooring.
- B. Single-Source Responsibility: Obtain resinous flooring materials, including primers, resins, hardening agents, and finish or sealing coats, from a single manufacturer.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages and containers with seals unbroken and bearing manufacturer's labels containing brand name and directions for storage and mixing with other components.
- B. Store materials to comply with manufacturer's directions to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

## 1.7 PROJECT CONDITIONS

A. Environmental Conditions: Comply with resinous flooring manufacturer's directions for maintenance of ambient and substrate temperature, moisture, humidity, ventilation, and other conditions required to execute and protect Work.

#### 1.8 WARRANTY

A. Provide manufacturer's warranty with flashing endorsement, signed by Applicator and authorized representative of manufacturer, and warranting flooring materials against failures resulting from normal exposure for a period of three (3) years.

#### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Provide "Bolidtop FiftyFifty" seamless flooring system, consisting of two-component viscous elastic synthetic resins with a total thickness of 2mm, or Liquid Elements, Sika Flooring Systems, in a mix of two closely related colors, custom mixed to create a duotone pattern, per Architect's sample. Color used in flooring must be UV-stable for a sunlit environment. Flooring shall consist of a 2mm thick mixture of solvent-free polymers based on natural materials. The floor shall be seamless and resistant to staining.
- B. Details shown on the drawings are those of Bolidt Flooring, "Bolidtop FiftyFifty seamless floor. Subject to compliance with requirements specified, other acceptable manufacturers are Liquid Elements "Duo Floor", and Sika Corporation "Decorative SIKAFLOOR".t

## 2.2 SUPPLEMENTAL MATERIALS

A. Flashing, Sheets, Cant Strips and Accessories: Types as recommended by flooring materials manufacturer, supplied for locations indicated and for locations recommended by manufacturer.

#### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where elastomeric liquid flooring is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

## 3.2 PREPARATION

- A. Existing floors to receive flooring must be leveled and prepped per the requirements of Section 035416.
- B. Substrate: Perform preparation and cleaning procedures according to flooring manufacturer's instructions for particular substrate conditions involved, and as specified. Provide clean, dry, and neutral substrate for flooring application.
- C. Materials: Prepare materials according to flooring system manufacturer's instructions.
- D. Starting of work implies acceptance of substrate.
- E. Install sound mat and waterproofing (where indicated) in accordance with manufacturer's requirements.

F. In locations where new infill slab for utilities trenching has been done in existing slabs, entire perimeter of infilled areas are to be filled with movement suppressing flexible joint material per manufacturer's recommended practice

## 3.3 APPLICATION

- A. General: Apply each component of resinous flooring system according to manufacturer's directions to produce a uniform monolithic flooring surface at the nominal thickness required.
  - 1. Start installation of flooring only in presence of manufacturer's technical representative who must approve (in writing to the Architect) condition of the prepared floor slab.
- B. Flooring system shall include the following minimum applications:
  - 1. Detail all cracks and control joints according to manufacturer's requirements.
  - 2. Bonding coat per manufacturer's requirements.
  - 3. Membrane coat per manufacturer's requirements.
  - 4. Reinforcement fabric as required by manufacturer.
  - 5. Smoothing coat for reinforced membrane systems as required by manufacturer.
  - 6. Wear course as required by manufacturer.
  - Topcoat/Sealer: One or two topcoats as required by manufacturer. Sheen of finished surface shall be selected by the Architect from manufacturer's complete range.

## 3.4 CURING, PROTECTION AND CLEANING

- A. Cure resinous flooring materials according to manufacturer's directions, taking care to prevent contamination during application stages and before completing curing process. Close application area for a minimum of 24 hours.
- B. Once flooring is installed, provide complete protection of the floor until the space(s) is ready to occupy.

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor materials, equipment and services necessary to complete the carpet tile as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Carpet tile.
  - 2. Adhesive.

## 1.3 RELATED SECTIONS

A. Concrete sub-floor – Section 033000.

#### 1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Firm with not less than five (5) years of experience in installation of commercial carpeting of type, quantity and installation methods similar to work of this Section.
- B. General Terminology/ Information Standard: Refer to current edition of "Carpet Specifier's Handbook" by The Carpet and Rug Institute; for definitions of terminology not otherwise defined herein, and for general recommendations and information.
- C. Carpet used on Project must be from same dye lot for each carpet type.

#### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's complete technical product data for each type of carpet, cushion and accessory item required.
- B. Samples: Submit full size samples of carpet tile and six (6) inches long samples of each type exposed edge stripping.
- C. Certification: Submit manufacturer's certification stating that carpet materials furnished comply with specified requirements.
  - 1. Include listing of mill register numbers for carpet furnished.
  - 2. Include supporting certified laboratory test data indicating that carpet meets or exceeds specified test requirements.
- D. Maintenance Data: Submit manufacturer's printed maintenance recommendations, including methods and frequency recommended for maintaining carpet in optimum conditions under anticipated traffic and use conditions.

### 1.6 EXTRA STOCK

A. Produce and deliver to project at least five (5) percent overrun on calculated yardage. Provide required overrun exclusive of carpet needed for proper installation, waste and usable scraps.

## 1.7 PRODUCT DELIVERY AND STORAGE

A. Deliver carpeting materials in original mill protective wrapping with mill register numbers and tags attached. Store inside, in well ventilated area, protected from weather, moisture and soiling.

### 1.8 WARRANTY

A. Provide special project warranty, signed by Contractor and Manufacturer (Carpet Mill), agreeing to repair or replace defective materials and workmanship of carpeting work during two (2) year warranty period following substantial completion. Attach copies of product warranty.

#### PART 2 PRODUCTS

#### 2.1 CARPET TILE

- A. Provide 24" x 24" 20 oz./sq. yd. solution-dyed nylon turfted carpet tile with Class 1 fire rating, Bolyu style "Control" with patterned scroll construction.
- B. Basis of design manufacturer is Bolyu Contract. Subject to compliance with requirements specified, other acceptable manufacturers are Object Carpet and Fletco Carpets.

## 2.2 ACCESSORIES

- A. Adhesive for Carpet Tile: Provide release type adhesive as recommended by the carpet tile manufacturer for use with carpet tile specified. Provide adhesive which complies with flame spread rating required for the carpet installation.
- B. Miscellaneous Materials: Provide the types of adhesives and tape, and other accessory items recommended by the carpet manufacturer and Installer for the conditions of installation and use.
- C. Leveling Compound: Latex/Portland cement flash patching and leveling compound No. DSP-520 made by H.B. Fuller or No. 226 with 3701 admixture made by Laticrete or by Mapei.

## PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where carpet tile is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

## 3.2 PRE-INSTALLATION REQUIREMENTS

A. Floor shall be clean and free of cracks and protrusions. Any gaps or cracks more than 1/16" wide to be filled in with latex leveling compound. Protrusions must be sanded down smooth, the floor cleanly swept and vacuumed if necessary to remove all dust and grit.

- B. Floor temperature shall be 65 deg., at least 24 hours prior to installation; and 48 hours after carpet is installed.
- C. Conduct a moisture test. The presence of moisture in the concrete floor will interfere with the curing and subsequent performance of the adhesive. Conduct the test as follows:
  - 1. Drive a concrete nail a half inch into the floor. Then remove the nail.
  - 2. Place a small amount of anhydrous calcium chloride or calcium sulphate crystals over the hole.
  - 3. Cover the crystals and the hole with a piece of flat glass and seal the edges with waterproof tape or putty. Since concrete pourings vary, repeat the test every 1500 sq. ft.
  - 4. Leave in place 72 hours. Any color change in the crystals indicates the presence of moisture. Do not apply carpet until slab is free of moisture and meets with approval of carpet adhesive manufacturer.
- D. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.

### 3.3 INSTALLATION, GENERAL

- A. Comply with manufacturer's instructions and recommendations. Maintain direction of pattern and texture, including lay of pile.
- B. Adhere all tiles with a full spread of adhesive. Dry-fit cut tiles and apply adhesive to tile back after tile has been cut.
- C. Tiles shall be installed in a monolithic corner to corner manner following arrows printed on back of each tile indicating pile direction. Tiles shall be installed in linear pattern.
- D. Vinyl reducer strips shall be used along any necessary open edges so as to maintain the fixed perimeter.

## 3.4 CLEANING UP

A. Upon completion of the carpeting installation in each area, visually inspect all carpet installed in that area and immediately remove all dirt, soil, and foreign substance from the exposed face; inspect all adjacent surfaces and remove all marks and stains caused by the carpet installation: remove all packaging materials, carpet scraps, and other debris from the carpet installation to the area of the job site set aside for its storage.

### 3.5 PROTECTION

A. In all areas, provide a temporary non-staining paper pathway in the direction of traffic.



#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the reinforced plastic paneling system as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Reinforced plastic paneling system.

2. Moldings.

### 1.3 RELATED SECTIONS

A. Gypsum Drywall - Section 092900.

## 1.4 QUALITY ASSURANCE

- A. All products of this section shall be FM Global approval.
- B. Installer: A firm which has at least three years' experience in work of the type required by this section and which is acceptable to the manufacturers of the primary materials.
- C. Source: Provide plastic panels which are the products of one manufacturer. Provide secondary materials, moldings and accessories which are acceptable to the panel manufacturer.
- D. In-Place Samples: Before beginning primary work of this section, provide typical inplace samples of each item and type of work at locations acceptable to the Architect and obtain the Architect's acceptance of visual qualities.
  - 1. Size of Sample: Not less than 32 square feet.
  - 2. Intent of Sample: The intent of the in-place sample is to obtain approval of a typical installation as early as possible so that problems, if any, can be corrected before the problem is repeated.
  - 3. Sample Disposition: Acceptable in-place samples may be incorporated into the finished work. Protect and maintain acceptable in-place samples throughout the work of this section to serve as criteria for acceptance of the work
- E. Burning Characteristics: Provide materials whose surface burning characteristics, when tested in compliance with ASTM E 84 are classified as Class A or Class 1.

## 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's product data, installation instructions, use limitations and recommendations for each material used. Provide certifications stating that materials comply with requirements.
- B. Initial Selection Samples: Submit minimum 3" x 3" samples showing complete range of colors, textures, and finishes available for each material used.

## 1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials and products in unopened factory labeled packages. Store and handle in strict compliance with manufacturer's instructions and recommendations.

Protect from all possible damage. Sequence deliveries to avoid delays, but minimize on-site storage.

## PART 2 PRODUCTS

#### 2.1 FIBERGLASS PLASTIC PANEL SYSTEM

- A. Products: Provide one of the following products:
  - 1. "Fiber-Lite Liner Panels," Nudo Products, Inc.
  - 2. "Fire-X Glasbord," Crane Composites, Inc.
  - 3. "Induro FRP," Marlite.
  - 4. "Glasliner FRP Wall Panels," Glasteel Fiberglass Reinforced Panels, Division of Stabilit America, Inc.
- B. Panel Characteristics: Provide one of the specified products having the following characteristics:
  - 1. Thickness: Not less than 0.09" thick.
  - 2. Texture: Manufacturer's standard pebble texture.
  - 3. Panel Size: Provide largest sizes available to minimize joints and seams.
  - 4. Colors: Provide panels and matching moldings and rivets as selected by the Architect from the manufacturer's standard colors.
- C. Moldings: Provide vinyl moldings as recommended and approved by the panel manufacturer.
- D. Panel Fasteners: Provide nylon rivets recommended by manufacturer for installing reinforced plastic panels to gypsum drywall and metal stud substrates. Do not use any metal in rivets.
- E. Accessories: Provide all necessary sealants, components and accessories as recommended by panel manufacturer for a complete, sanitary, easy-to-clean installation. Use only sanitary, mold inhibiting USDA approved silicone sealant.

## PART 3 EXECUTION

#### 3.1 INSTALLATION

A. Pre-Installation Examination Required: The Installer shall examine previous work, related work, and conditions under which this work is to be performed and notify

- Contractor in writing of all deficiencies and conditions detrimental to the proper completion of this work. Beginning work means Installer accepts substrates, previous work, and conditions.
- B. Manufacturer's Instructions: Strictly comply with manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this section.
- C. Installation: Mechanically attach panels to substrates indicated using non-metallic rivets at spacing recommended by panel manufacturer. Provide expansion clearance at all panel edges as required by manufacturer, but make sure moldings cover panel edges. Gaps are not permitted.
  - 1. Trim and Molding: Provide moldings at all edges, joints, seams and corners. Provide moldings having the easiest to clean shapes and profiles available.
  - 2. Sealing: Seal all edges, joints, seams, and corners as the work progresses.
- D. Tolerances: The following allowable installed tolerances are allowable variations from locations and dimensions indicated by the Contract Documents and shall not be added to allowable tolerances indicated for other work.
  - 1. Allowable Variation from True Plumb, Level, and Line: ± 1/8" in 20'-0".
  - 2. Allowable Variation from True Plane: 1/8" in 10'-0".

# 3.2 CLEANING AND PROTECTION

- A. Cleaning: Clean exposed surfaces using non-abrasive materials and methods recommended by manufacturer of material or product being cleaned. Remove and replace work that cannot be successfully cleaned or repaired.
- B. Protection: Provide temporary protection to ensure work is without damage or deterioration at time of final acceptance. Remove protections and re-clean as necessary immediately before final acceptance.

# 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

#### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the acoustical wall panels as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. 2" thick acoustical absorption panels wrapped in selected fabric.

#### 1.3 RELATED SECTIONS

- A. Carpentry Section 062000.
- B. Gypsum wallboard Section 092900.

## 1.4 QUALITY ASSURANCE

A. Manufacturer Qualification: At least 5 years' experience fabricating and installing comparable work, employing skilled mechanics under competent supervision for all phases of the Work.

## 1.5 SUBMITTALS

- A. Shop Drawings/Product Data
  - 1. Base drawings on field measurements.
  - 2. Show dimensioned wall elevations with seam and joint locations, cutout sizes and locations, anchor locations, relation to adjacent work; large scale joint and mounting details; materials type, weight/thickness, design, color; and other data necessary to fabricate and install work and coordinate work with affected trades.
- B. Samples: Two 12" x 12" (minimum) panels in selected finish, showing seam, edge and cutout conditions.

## C. Certification

- 1. Acoustical Performance: Certified reports of acoustical performance tests conducted and/or witnessed by a recognized, independent, testing agency. Tests shall have been done by specified methods or recognized equivalent. Sound absorption tests shall be not more than three years old. Reports on earlier tests are acceptable if it can be established to the Architect's satisfaction, that they are valid indications of compliance with Project requirements.
- 2. Fire Hazard: Evidence of compliance with regulatory agency and specifications requirements.
- D. Cleaning and Maintenance Instructions: Recommendations for Owner maintenance and cleaning per Section 017300 requirements. Identify cleaning/spotting products generically or by trade name.
- E. Manufacturer Qualifications: List comparable installations with 3-year (minimum) service histories. Describe installations and give Owner/building manager names and addresses.

#### 1.6 REFERENCES

- A. ASTM C 423, Test for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
- B. ASTM E 84, Test for Surface Burning Characteristics of Building Materials.

## 1.7 DELIVERY, STORAGE AND HANDLING

A. Allow materials to become acclimated to Project conditions before installation, if necessary to prevent sag and distortion during service life.

## 1.8 PROJECT CONDITIONS

- A. Work areas shall be at or near ambient occupancy temperature and relative humidity.
- B. Painting, dust-raising activities, and work that introduces dampness shall be completed.

#### PART 2 PRODUCTS

## 2.1 MANUFACTURERS

A. Basis of Design: Kinetics Noise Control "High Impact Hardside Acoustical Wall Panel", subject to compliance with requirements specified, other acceptable manufacturers' products are Decoustics "High Impact Resilient Wall Panel (H.I.R. #1)" or Panel Solutions Inc. "PS90ALD".

### 2.2 GENERAL

- A. Fabricate panels to sizes and configurations indicated; attach facing materials to cores to produce installed panels with visible surfaces fully covered and free from waves in fabric weave, wrinkles, sages, blisters, seams, adhesive or other foreign matter.
  - 1. Fabricate back mounted panels in factory to exact sizes required to fit wall surfaces based on field measurements of completed substrates indicated to receive acoustical wall panels.
  - 2. Where radius corners are indicated, attach facing material so there are no seams or gathering of material.
- B. Dimensional Tolerances of Finished Units: Overall height and width of panels, plus or minus 1/16".
- C. Sound Absorption Performance: Provide acoustical wall panels with minimum noise reduction coefficients (NRC) indicated, as determined by testing per ASTM C 423 for mounting type specified under individual product requirements.

- D. Colors, Textures, and Patterns: Where manufacturer's standard material is indicated, provide acoustical wall panels faced with manufacturer's material complying with the following requirements:
  - 1. Provide Architect's selections from manufacturer's full range of colors, textures, and patterns for products of type indicated.

## 2.3 BACK MOUNTED ACOUSTICAL WALL PANELS

- A. Back Mounted, Edge Reinforced Acoustical Wall Panels: Manufacturer's standard panel construction consisting of facing material laminated to front, edges, and back border of molded glass fiber board core; with edges chemically hardened to reinforce panel perimeter against warpage and damaged; and complying with the following requirements:
  - 1. Core Density: 6 7 lb./cu. ft.
  - 2. Thickness and NRC: Nominal overall panel thickness of 2" and NRC of not less than 0.95 for Type A (ABPMA No. 4) mounting.
  - 3. Facing Material: Guilford of Maine "Hatchet" style fabric in color 2977-031 "Armament".
  - 4. Panel Size: As indicated.
  - 5. Edge Detail: Square.

## 2.4 ACCESSORIES

- A. Back Mounting Accessories: Manufacturer's standard or recommended accessories for securely mounting panels of type and size indicated to substrates provided, and complying with the following requirements:
  - Mechanically Mounted Edge Reinforced Panels: Metal panel clip and base support bracket system consisting of 2 part panel clips, with one part of each clip mechanically attached to back of panel and the other part to wall substrate, designed to support panels laterally; and base support brackets designed to support full weight of panels; with both designed to allow panel removal.

## PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where acoustical wall panels are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 INSTALLATION

A. General: Install acoustical wall panels in locations indicated with vertical surfaces and edges plumb, top edges level and in alignment with other panels, scribed to fit adjoining work accurately at borders and at penetrations. Comply with panel manufacturer's printed instructions for installation of panels using type of mounting accessories indicated or, if none indicated, as recommended by manufacturer.

## B. Construction Tolerances

- 1. Variation from Plumb and Level: +/- 1/16".
- 2. Variation of Joints from Hairline: Not more than 1/16".
- C. Anchoring to Drywall: Anchor clips to unreinforced gypsum board with toggle or Molly anchors. Anchor clips to metal drywall framing with tapping sheet metal screws.
- D. Panels shall be pressed against wall and slid down engaging "Z" clips into wall brackets.
- E. Remove and replace panels that are damaged and are unacceptable to Architect.

#### 3.3 ADJUSTING AND CLEANING

- A. Correct non-complying and damaged/defective Work. Replace work that cannot be satisfactorily repaired.
- B. Restretch and reinstall sagging and distorted fabric and correct other defects that occurred during normal service.
- C. Carefully and thoroughly clean completed work by vacuuming and/or other means. Remove soil, stains, loose threads.
- D. Protect work from soiling and other damage.



### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the painting and finishing as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Prime painting unprimed surfaces to be painted under this Section.
  - 2. Painting all items furnished with a prime coat of paint, including touching up of or repairing of abraded, damaged or rusted prime coats applied by others.

- 3. Painting all ferrous metal (except stainless steel) exposed to view.
- 4. Painting all galvanized ferrous metals exposed to view.
- 5. Painting interior concrete block exposed to view.
- 6. Painting gypsum drywall exposed to view.
- 7. Sealing concrete floors.
- 8. Painting of wood exposed to view, except items which are specified to be painted or finished under other Sections of these specifications. Back painting of all wood in contact with concrete, masonry or other moisture areas.
- 9. Washable paint.
- 10. Painting pipes, pipe coverings, conduit, ducts, insulation, hangers, supports and other mechanical and electrical items and equipment exposed to view.
- 11. Painting surfaces above, behind or below grilles, gratings, diffusers, louvers, lighting fixtures, and the like, which are exposed to view through these items, including equipment items that may have a factory finish.
- 12. Incidental painting and touching up as required to produce proper finish for painted surfaces, including touching up of factory finished items.
- 13. Painting of any surface not specifically mentioned to be painted herein or on drawings, but for which painting is obviously necessary to complete the job, or work which comes within the intent of these specifications, shall be included as though specified.

### 1.3 RELATED SECTIONS

- A. Shop priming is required on some, but not all of the items scheduled to be field painted. Refer to other Sections of work for complete description.
- B. Shop Coat on Machinery and Equipment: Refer to the Sections under which various items of manufactured equipment with factory applied shop prime coats are furnished, including, but not necessarily limited to, the following Sections. All items of equipment furnished with prime coat finish shall be finish painted under this Section.
  - 1. Plumbing Division 22.
  - 2. Heating, Ventilation and Air Conditioning Division 23.
- C. Color Coding of Mechanical Piping and Electrical Conduits Divisions 22 and 26.
  - 1. This Color Coding consists of an adhesive tape system and is in addition to painting of piping and conduits under this Section, as specified above.

### 1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

- A. Items of equipment furnished with complete factory finish, except for items specified to be given a finish coat under this Section.
- B. Factory-finished toilet partitions.
- C. Factory-finished acoustical tile.
- D. Non-ferrous metals, except for items specified and/or indicated to be painted.
- E. Finished hardware, excepting hardware that is factory primed.
- F. Surfaces not to be painted shall be left completely free of droppings and accidentally applied materials resulting from the work of this Section.

### 1.5 QUALITY ASSURANCE

## A. Job Mock-Up

- In addition to the samples specified herein to be submitted for approval, apply in the field, at their final location, each type and color of approved paint materials, applied 10 feet wide, floor to ceiling of wall surfaces, before proceeding with the remainder of the work, for approval by the Architect. Paint mock-ups to include door and frame assembly.
- 2. These applications when approved will establish the quality and workmanship for the work of this Section.
- 3. Repaint individual areas which are not approved, as determined by the Architect, until approval is received. Assume at least two paint mock-ups of each color and gloss for approval.
- B. Qualification of Painters: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces.
- C. Paint Coordination: Provide finish coats which are compatible with the prime paints used. Review other Sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates. Upon request from other subcontractors, furnish information on the characteristics of the finish materials proposed to be used, to ensure that compatible prime coats are used. Provide barrier coats over incompatible primers or remove and re-prime as required. Notify the Architect in writing of any anticipated problems using the coating systems as specified with substrates primed by others.
- All paints must conform to the Volatile Organic Compounds (VOC) standards of prevailing codes and ordinances.

### 1.6 SUBMITTALS

A. Materials List: Before any paint materials are delivered to the job site, submit to the Architect a complete list of all materials proposed to be furnished and installed under this portion of the work. This shall in no way be construed as permitting substitution of materials for those specified or accepted for this work by the Architect.

## B. Samples

- 1. Accompanying the materials list, submit to the Architect copies of the full range of colors available in each of the proposed products.
- 2. Upon direction of the Architect, prepare and deliver to the Architect two (2) identical sets of Samples of each of the selected colors and glosses painted onto 8-1/2" x 11" x 1/4" thick material; whenever possible, the material for Samples shall be the same material as that on which the coating will be applied in the work.
- C. Manufacturer's Recommendations: In each case where material proposed is not the material specified or specifically described as an acceptable alternate in this Section of these specifications, submit for the Architect's review the current recommended method of application published by the manufacturer of the proposed material.

### D. Closeout Submittal

 Coating Maintenance Manual: Upon conclusion of the project, the Contractor or paint manufacturer/supplier shall furnish a coating maintenance manual such as Sherwin Williams "Custodian Project Color and Product Information" report or equal. Manual shall include an Area Summary with finish schedule, Area Detail designating where each product/color/finish was used, product data pages, MSDS, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

## 1.7 PRODUCT HANDLING

A. Deliver all paint materials to the job site in their original unopened containers with all labels intact and legible at time of use.

### B. Protection

- 1. Store only the approved materials at the job site, and store only in a suitable and designated area restricted to the storage of paint materials and related equipment.
- 2. Use all means necessary to ensure the safe storage and use of paint materials and the prompt and safe disposal of waste.
- 3. Use all means necessary to protect paint materials before, during and after application and to protect the installed work and materials of all other trades.

C. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

### 1.8 EXTRA STOCK

A. Upon completion of this portion of the Work, deliver to the Owner an extra stock of paint equaling approximately ten (10) percent of each color and gloss used and each coating material used, with all such extra stock tightly sealed in clearly labeled containers.

### 1.9 JOB CONDITIONS

- A. Apply water-based paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 90 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 45 degrees F. and 95 degrees F. unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist; or when the relative humidity exceeds eighty-five (85) percent; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.
- D. Painting may be continued during inclement weather only if the areas and surfaces to be painted are enclosed and heated within the temperature limits specified by the paint manufacturer during application and drying periods.

### PART 2 PRODUCTS

### 2.1 PAINT MANUFACTURERS

A. Except as otherwise noted, provide the painting products listed for all required painting made by one of the manufacturers listed in the paint schedule (Section 2.4). These companies are Benjamin Moore, PPG Paint, and Sherwin Williams (S-W). Comply with number of coats and required minimum mil thicknesses as specified herein.

### 2.2 MATERIALS

- A. Provide undercoat paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommended limits.
- B. Colors and Glosses: All colors and glosses shall be as selected by the Architect. Certain colors will require paint manufacturer to prepare special factory mixes to match colors selected by the Architect. Color schedule (with gloss) shall be furnished by the Architect.

- C. Coloring Pigment: Products of or furnished by the manufacturer of the paint or enamel approved for the work.
- Linseed Oil: Raw or boiled, as required, of approved manufacture, per ASTM D 234 and D 260, respectively.
- E. Turpentine: Pure distilled gum spirits of turpentine, per ASTM D 13.
- F. Shellac: Pure gum shellac (white or orange) cut in pure denatured alcohol using not less than four (4) lbs. of gum per gallon of alcohol.
- G. Driers, Putty, Spackling Compound, Patching Plaster, etc.: Best quality, of approved manufacture.
- H. Heat Resistant Paint: Where required, use heat resistant paint when applying paint to heating lines and equipment.

### 2.3 GENERAL STANDARDS

- A. The various surfaces shall be painted or finished as specified below in Article 2.4. However, the Architect reserves the right to change the finishes within the range of flat, semi-gloss or gloss, without additional cost to the Owner.
- B. All paints, varnishes, enamels, lacquers, stains and similar materials must be delivered in the original containers with the seals unbroken and label intact and with the manufacturer's instructions printed thereon.
- C. All painting materials shall bear identifying labels on the containers with the manufacturer's instructions printed thereon.
- D. Paint shall not be badly settled, caked or thickened in the container, shall be readily dispersed with a paddle to a smooth consistency and shall have excellent application properties.
- E. Paint shall arrive on the job color-mixed except for tinting of under-coats and possible thinning.
- F. All thinning and tinting materials shall be as recommended by the manufacturer for the particular material thinned or tinted.
- G. It shall be the responsibility of the Contractor to see that all mixed colors match the color selection made by the Architect prior to application of the coating.

### 2.4 SCHEDULE OF FINISHES

A. High Performance Coating On Exterior Galvanized Ferrous Metals

First Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by International Protective Coatings; "Carboguard 893 SG" or "Carboguard

888" by Carboline; "Devran 203 WB Epoxy Primer" by PPG; Epoxy

Mastic Coating V 160 Series by Cortech/Moore or "Recoatable Epoxy

Primer 867-45" by Sherwin Williams.

Second Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS"

or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379UH Aliphatic Vizethne" by PPG; Acrylic Aliphatic Urethane V 500 (Gloss) or V 510 (Semi-Gloss) by Corotech/Moore or "Hi-Solids Urethane B65-300/350" by Sherwin

Williams.

# B. High Performance Coating On Exterior Non-Galvanized Ferrous Metals

Prime Coat: "Tneme-Zinc 90/97" by Tnemec; "Interzinc 52" or "315" by International

Protective Coatings; "Carbozinc 859, Class B" by Carboline; "Cathacoat 302V Reinforced Inorganic Zinc Primer" by PPG; Organic Zinc Rich Primer V 170 by Corotech/Moore or "Zinc Clad II Plus Inorganic Zinc

Rich Coating B69V212" by Sherwin Williams.

Second Coat: "27 Typoxy" or "N69 Epoxoline II" by Tnemec; "Intergard 345" by

International Protective Coatings; "Carboguard 893 SG" or "Carboguard 888" by Carboline; "Bar-Rust 231V Multi Purpose Epoxy Mastic" by PPG; Epoxy Mastic Coating V 160 Series by Corotech/Moore or

"Macropoxy 646 I.C. Epoxy B58-600" by Sherwin Williams.

Third Coat: "V73 Endura Shield" or "1074/1075" by Tnemec; "Interthane 870UHS"

or "990 UHS" by International Protective Coatings; "Carbothane 133 LH" by Carboline; "Devthane 379 UH Aliphatic Urethane" by PPG; Acrylic Aliphatic Urethane V 500 (Gloss) or V 510 (Semi-Gloss) by Corotech/Moore or "Hi-Solids Polyurethane B65-300/350" by Sherwin

Williams.

### C. Interior Ferrous Metal

Satin Finish/Latex

Primer: Benj. Moore Alkyd Metal Primer (P06)

PPG Devflex 4020 PF DTM Primer/Flat Finish or touch-up shop

primer

Sherwin-Williams Pro Industrial Pro-Cryl Universal Primer B66-310

First Coat: Benj. Moore Ultra Spec-HP DTM Acrylic Low Luster P25

PPG Glidden Professional Diamond 350 Acrylic Eggshell GP1403

S-W Pro-Classic Waterborne Acrylic Satin, B20

Second Coat: Benj. Moore Ultra Spec-HP DTM Acrylic Low Luster P25

PPG Glidden Professional Diamond 350 Acrylic Eggshell GP1403

S-W Pro-Classic Waterborne Acrylic Satin, B20

a. Total DFT not less than: 3.9 mils

Semi-Gloss Finish/Latex

Primer: Benj. Moore Super Spec-HP Acrylic Metal Primer (P04)

PPG Devflex 4020 PF DTM Primer/Flat Finish or touch-up shop

primer

Sherwin-Williams, Pro Industrial Pro-Cryl Universal Primer B66-310

First Coat: Benj. Moore Ultra Spec HP DTM Acrylic Semi-Gloss (P29)

PPG Glidden Professional Diamond 350 Acrylic S/G 6P1407

S-W Pro-Classic Waterborne Acrylic Semi-Gloss, B31

Second Coat: Beni, Moore Ultra Spec HP DTM Acrylic Semi-Gloss (P29)

PPG Glidden Professional Diamond 350 Acrylic S/G 6P1407

S-W Pro-Classic Waterborne Acrylic Semi-Gloss, B31

a. Total DFT not less than: 4.0 mils

### D. Interior Concrete Block

Flat Finish/Vinyl Acrylic Latex over Filler

Block Filler: Benj. Moore Super Spec Masonry Int./Ext. High Build Block Filler (206)

PPG Glidden Speedhide Block Filler 6-7

S-W Preprite Block Filler, B25W25

First Coat: Benj. Moore Ultra Spec 500 Interior Flat Latex (N536)

PPG Glidden Professional Diamond 350 Flat GP 1201

S-W Promar 200 Zero VOC Interior Latex Flat, B30-2600

Second Coat:Benj. Moore Ultra Spec 500 Interior Flat Latex (N536)

PPG Glidden Professional Diamond 350 Flat GP 1201 S-W Promar 200 Zero VOC Interior Latex Flat, B30-2600

a. Total DFT not less than: 10.7 mils

Eggshell Finish/Vinyl Acrylic Latex Over Filler

Block Filler: Benj. Moore Super Spec Masonry Int./Ext. High Build Block Filler (206)

PPG Glidden Speedhide Block Filler 6-7

S-W Preprite Block Filler, B25W25

First Coat: Benj. Moore Ultra Spec 500 Interior Latex Eggshell (N538)

PPG Glidden Professional Diamond 350 Acrylic Eggshell 6P1403

S-W Promar 200 Zero VOC Interior Latex Eggshell, B20-2600

Second Coat: Benj. Moore Ultra Spec 500 Interior Latex Eggshell (N538)

PPG Glidden Professional Diamond 350 Acrylic Eggshell 6P1403 S-W Promar 200 Zero VOC Interior Latex Eggshell, B30-2600

a. Total DFT not less than: 10.9 mils

Semi-Gloss Finish/Vinyl Acrylic Latex over Filler

Block Filler: Benj. Moore Super Spec Masonry Int./Ext. High Build Block Filler (206)

PPG Glidden Speedhide Block Filler 6-7

S-W Preprite Block Filler, B25W25

First Coat: Benj. Moore Ultra Spec 500 Interior Latex Gloss (N540)

PPG Glidden Professional Diamond 350 Acrylic S/G GP 1407

S-W Promar 200 Zero VOC Interior Latex S. Gloss, B31-2600

Second Coat: Benj. Moore Ultra Spec 500 Interior Latex Gloss (N540)

PPG Glidden Professional Diamond 350 Acrylic S/G GP 1407 S-W Promar 200 Zero VOC Interior Latex S. Gloss, B31-2600

a. Total DFT not less than: 10.7 mils

# E. Interior Drywall

Flat Finish/Vinyl Acrylic Latex

Primer: Benj. Moore Ultra Spec 500 Interior Latex Primer (N534)

PPG Glidden Professional Gripper GP 3210

S-W Promar 200 Interior Latex Primer

First Coat: Benj. Moore Ultra Spec 500 Latex Flat (N536)

PPG Glidden Professional Diamond 350 Flat GP 1201 S-W Promar 200 Zero VOC Interior Latex Flat, B30-2600

Second Coat: Benj. Moore Ultra Spec 500 Latex Flat (N536)

PPG Glidden Professional Diamond 350 Flat GP 1201 S-W Promar 200 Zero VOC Interior Latex Flat, B30-2600

a. Total DFT not less than: 3.6 mils

Eggshell Finish/Vinyl Acrylic Latex

Primer: Benj. Moore Ultra Spec 500 Interior Latex Primer (N534)

PPG Glidden Professional Gripper GP 3210 S-W Promar 200 Interior Latex Primer,

First Coat: Benj. Moore Ultra Spec 500 Interior Latex Eggshell (N538)

PPG Glidden Professional Diamond 350 Acrylic Eggshell GP 1403 S-W Promar 200 Zero VOC Interior Latex Egg-Shell, B20-2600

Second Coat: Benj. Moore Ultra Spec 500 Interior Latex Eggshell (N538)

PPG Glidden Professional Diamond 350 Acrylic Eggshell GP 1403 S-W Promar 200 Zero VOC Interior Latex Egg-Shell B20-2600

a. Total DFT not less than: 3.8 mils

### F. Interior Painted Wood

Satin Finish/Latex

Primer: Benj. Moore Advance Waterborne Int. Alkyd Primer (790)

PPG Glidden Professional Gripper GP 3210 S-W Premium Wall and Wood Primer B28W111

First Coat: Beni. Moore Advance Waterborne Int. Alkyd Satin (792)

PPG Glidden Professional Diamond 350 Acrylic Eggshell GP 1403

S-W Pro Classic Interior WB, Acrylic/Alkyd Classic B20.

Second Coat: Benj. Moore Advance Waterborne Int. Alkyd Satin (792)

PPG Glidden Professional Diamond 350 Acrylic Eggshell GP 1403

S-W Pro Classic Interior WB, Acrylic/Alkyd Classic B20.

a. Total DFT not less than: 4.0 mils

Semi-Gloss Finish/Latex

Primer: Benj. Moore Advance Waterborne Int. Alkyd Primer (790)

PPG Glidden Professional Gripper GP 3210
S-W Premium Wall and Wood Primer B28W111
Pagi Magra Advance Weterbarra Int. Allard (70)

First Coat: Benj. Moore Advance Waterborne Int. Alkyd (793)

PPG Glidden Professional Diamond 350 Acrylic S/G GP 1407 S-W Pro Classic Interior WB, Acrylic/Alkyd Classic Semi-Gloss B31 Second Coat: Benj. Moore Advance Waterborne Int. Alkyd (793)
PPG Glidden Professional Diamond 350 Acrylic S/G GP 1407
S-W Pro Classic Interior WB, Acrylic/Alkyd Classic Semi-Gloss B31
a. Total DFT not less than: 3.8 mils

- G. Concrete Floor Sealer: "Super Diamond VOX" water-based, low-VOC acrylic sealer, as manufactured by Euclid Chemical Company, or approved equal.
- H. Washable Paint: Provide Scuffmaster "Ambient Design" (basis of design) multi-tone and tone-on-tone paint finish system as manufactured by Master Coating Technologies, or comparable product of DFB Tuffcoat, Island Diversified Decorative Finishes; or Scuffmaster "Solid Metal" with metallic finish, where indicated. Where washable paint is scheduled on the drawings, provide 2 coats minimum; use with "Primemaster Primer/Sealer," a latex-based acrylic primer to be used in conjunction with Scuffmaster products, or similar product as recommended by the manufacturer for application indicated. See preparation requirements for gypsum drywall, Level 5 finish, in Section 092900 for all walls and ceilings to receive washable paint.
  - 1. VOC: Coatings shall have less than 75 g/l of VOCs.
  - 2. Fire Rating: Coatings shall be Type I or Class A fire-rated per ASTM E 84.
  - 3. Scrub Test: Greater than 13,000 cycles, per ASTM D 2486.
  - 4. Impact Resistance: Greater than 60 in/lbs. per ASTM D 2794.

# 2.5 EXISTING SURFACES TO BE PAINTED

A. Existing surfaces shall be painted in accordance with schedule given in Article 2.4 herein except that first or prime coat may be eliminated where existing paint is sound. Where existing paint must be removed down to base material, provide first or prime coat as specified.

# 2.6 PIPING AND MECHANICAL EQUIPMENT EXPOSED TO VIEW

- A. Paint all exposed piping, conduits, ductwork and mechanical and electrical equipment. Use heat resisting paint when applied to heating lines and equipment. The Contractor is cautioned not to paint or otherwise disturb moving parts in the mechanical systems. Mask or otherwise protect all parts as required to prevent damage.
- B. Exposed Uncovered Ductwork, Piping, Hangers and Equipment: Latex Enamel Undercoater and one (1) coat Acrylic Latex Flat.
- C. Exposed Covered Piping, Duct Work and Equipment: Primer/Sealer and one (1) coat Acrylic Latex Flat.
- D. Panel Boards, Grilles and Exposed Surfaces of Electrical Equipment: Latex Enamel Undercoater and two (2) coats Latex Semi-Gloss.

- E. Equipment or Apparatus with Factory-Applied Paint: Refinish any damaged surfaces to match original finish. Do not paint over name plates and labels.
- F. All surfaces of insulation and all other work to be painted shall be wiped or washed clean before any painting is started.
- G. All conduit, boxes, distribution boxes, light and power panels, hangers, clamps, etc., are included where painting is required.
- H. All items of Mechanical and Electrical trades which are furnished painted under their respective Contracts shall be carefully coordinated with the work of this Section so as to leave no doubt as to what items are scheduled to be painted under this Section.

### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where painting and finishing are to be applied and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

# 3.2 GENERAL WORKMANSHIP REQUIREMENTS

- A. Only skilled mechanics shall be employed. Application may be by brush or roller. Spray application only upon acceptance from the Architect in writing.
- B. The Contractor shall furnish the Architect a schedule showing when he expects to have completed the respective coats of paint for the various areas and surfaces. This schedule shall be kept current as the job progresses.
- C. The Contractor shall protect his work at all times, and shall protect all adjacent work and materials by suitable covering or other method during progress of his work. Upon completion of the work, he shall remove all paint and varnish spots from floors, glass and other surfaces. He shall remove from the premises all rubbish and accumulated materials of whatever nature not caused by others and shall leave his part of the work in clean, orderly and acceptable condition.
- D. Remove and protect hardware, accessories, device plates, lighting fixtures, and factory finished work, and similar items, or provide ample in place protection. Upon completion of each space, carefully replace all removed items by workmen skilled in the trades involved.
- E. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.

- F. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive roller stipple.
- G. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage, at no additional cost to the Owner.
- H. All coats shall be dry to manufacturer's recommendations before applying succeeding coats.
- I. Do not apply paint behind frameless mirrors that use mastic for adhering to wall surface.

### 3.3 PREPARATION OF SURFACES

A. Existing Surfaces: Clean existing surfaces requiring paint or finishing, remove all loose and flaking paint or finish and sand surface smooth as required to receive new paint or finish. No "telegraphing" of lines, ridges, flakes, etc., through new surfacing is permitted. Where this occurs, Contractor shall be required to sand smooth and refinish until surface meets with Architect's approval.

### B. General

- The Contractor shall be held wholly responsible for the finished appearance and satisfactory completion of painting work. Properly prepare all surfaces to receive paint, which includes cleaning, sanding, and touching-up of all prime coats applied under other Sections of the work. Broom clean all spaces before painting is started. All surfaces to be painted or finished shall be perfectly dry, clean and smooth.
- 2. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
- 3. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall in wet, newly painted surfaces.

# C. Metal Surfaces

- 1. Weld Fluxes: Remove weld fluxes, splatters, and alkali contaminants from metal surfaces in an approved manner and leave surface ready to receive painting.
- 2. Bare Metal: Thoroughly clean off all foreign matter such as grease, rust, scale and dirt before priming coat is applied. Clean surfaces, where solder flux has been used, with benzene. Clean surfaces by flushing with mineral spirits. For

aluminum surfaces, wipe down with an oil free solvent prior to application of any pre-treatment.

- a. Bare metal to receive high performance coating specified herein must be blast cleaned SSPC SP-6 prior to application if field applied primer; coordinate with steel trades furnishing ferrous metals to receive this coating to insure that this cleaning method is followed.
- 3. Shop Primed Metal: Clean off foreign matter as specified for "Bare Metal." Prime bare, rusted, abraded and marred surfaces with approved primer after proper cleaning of surfaces. Sandpaper all rough surfaces smooth.
- 4. Galvanized Metal: Prepare surface as per the requirements of ASTM D 6386.
- 5. Metal Filler: Fill dents, cracks, hollow places, open joints and other irregularities in metal work to be painted with an approved metal filler suitable for the purpose and meeting the requirements of the related Section of work; after setting, sand to a smooth, hard finish, flush with adjoining surface.
- D. Gypsum Drywall Surfaces: Scrape off all projections and splatters, spackles all holes or depressions, including taped and spackled joints, sand smooth. Conform to standards established in Section 092900, "Gypsum Drywall."
- E. Wood Surfaces: Sand to remove all roughness, loose edges, slivers, or splinters and then brush to remove dust. Wash off grease or dirt with an approved cleaner. Fill all cracks, splits, nail holes, screw holes, and surface defects with putty after the priming coat has been applied. Putty shall be brought up flush with the surface and sanded smooth and touched-up with primer when dry.
- F. Block Masonry Surfaces: Thoroughly clean off all grit, grease, dirt mortar drippings or splatters, and other foreign matter. Remove nibs or projections from masonry surfaces. Fill cracks, holes or voids, not filled under the "Masonry" Section, with Portland cement grout, and bag surface so that it has approximately the same texture as the adjacent masonry surface.
- G. Testing for Moisture Content: Contractor shall test all masonry and drywall surfaces for moisture content using a reliable electronic moisture meter. Contractor shall also test latex type fillers for moisture content before application of top coats of paint. Do not apply any paint or sealer to any surface or to latex type filler where the moisture content exceeds seven (7) percent as measured by the electronic moisture meter.
- H. Touch-Up: Prime paint all patched portions in addition to all other specified coats.

### 3.4 MATERIALS PREPARATION

A. Mix and prepare painting materials in strict accordance with the manufacturer's directions.

- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials. Do not stir any film which may form on the surface into the material. Remove the film and, if necessary, strain the material before using.
- D. Tint each undercoat a lighter shade to facilitate identification of each coat where multiple coats of the same material are to be applied. Tint undercoats to match the color of the finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

### 3.5 APPLICATION

- A. General: Apply paint by brush or roller in accordance with the manufacturer's directions. Use brushes best suited for the type of material being applied. Use rollers of carpet, velvet back, or high pile sheep's wool as recommended by the paint manufacturer for material and texture required.
  - The number of coats and paint film thickness required is the same regardless of the application method. Do not apply succeeding coats until the previous coat has completely dried. Sand between each enamel or varnish coat application with fine sandpaper, or rub surfaces with pumice stone where required to produce an even, smooth surface in accordance with the coating manufacturer's directions.
  - Apply additional coats when undercoats, stains, or other conditions show through the final coat of paint, until the paint film is of uniform finish, color and appearance. Give special attention to insure that all surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a film thickness equivalent to that of flat surfaces.
  - 3. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind permanently fixed equipment or furniture with prime coat only.
    - a. "Exposed surfaces" is defined as those areas visible when permanent or built-in fixtures, convector covers, covers for finned tube radiation, grilles, etc., are in place in areas scheduled to be painted.
  - 4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint, before final installation of equipment.
  - 5. Paint the back sides of access panels, removable or hinged covers to match the exposed surfaces.
  - 6. Finish doors on tops, bottoms, and side edges the same as the faces, unless otherwise indicated.

- 7. Enamel finish applied to wood or metal shall be sanded with fine sandpaper and then cleaned between coats to produce an even surface.
- 8. Paste wood filler applied on open grained wood after beginning to flatten, shall be wiped across the grain of the wood, then with a circular motion, to secure a smooth, filled, clean surface with filler remaining in open grain only. After overnight dry, sand surface with the grain until smooth before applying specified coat.

### B. Scheduling Painting

- 1. Apply the first coat material to surfaces that have been cleaned, pre-treated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
- 2. Allow sufficient time between successive coatings to permit proper drying. Do not re-coat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and the application of another coat of paint does not cause lifting or loss of adhesion of the undercoat.
- C. Prime Coats: Re-coat primed and sealed walls and ceilings where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burnthrough or other defects due to insufficient sealing.
- D. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage.
- E. Touching-Up of Factory Finishes: Unless otherwise specified or shown, materials with a factory finish shall not be painted at the project site. To touch up, the Contractor shall use the factory finished material manufacturer's recommended paint materials to repair abraded, chipped, or otherwise defective surfaces.

## 3.6 PROTECTION

- A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing, and repainting, as acceptable to the Architect.
- B. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

### 3.7 CLEAN UP

A. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.

- B. Upon completion of painting work, clean window glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

**END OF SECTION** 

#### PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the visual display surfaces as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Porcelain-on-metal marker boards.

- 2. Plastic-impregnated tackboards.
- 3. Frames and trim.

### 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Gypsum Drywall Section 092900.

### 1.4 QUALITY ASSURANCE

- A. Qualifications of Installers: For installation of marker boards and tackboards, use only personnel who are thoroughly trained and experienced in the skills involved and who are completely familiar with the manufacturer's recommended methods of installation.
- B. Installation Methods: The recommended installation methods of the manufacturer shall become the basis for acceptance or rejection of actual installation methods used in the work.
- C. Manufacturer: Furnish all marker boards and tackboards by one manufacturer for entire project.

### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating that materials comply with requirements.
- B. Shop Drawings: Submit for each type of marker board and tackboard. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, and installation details.
- C. Samples: Submit full range of color samples for each type of marker board, tackboard, trim and accessories required. Provide 12" square samples of sheet materials and 12" lengths of trim members for color verification after selections have been made.

### 1.6 SPECIAL PROJECT WARRANTY

A. Warranty on Porcelain Enamel Marker Boards: Provide written warranty, signed by manufacturer, agreeing to replace, within warranty period of twenty-five (25) years porcelain enamel marker boards which do not retain original writing and erasing qualities, defined to include surfaces which become slick and shiny, or exhibit crazing, cracking or flaking; provide manufacturer's instructions for handling, installing, protecting and maintaining marker boards have been adhered to during the warranty period. Replacement is limited to material replacement only and does not include labor for removal and reinstallation.

### 1.7 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

### PART 2 PRODUCTS

#### 2.1 MARKER BOARDS

#### A. Construction

- 1. Porcelain surface on 24 ga. steel, designed for marker board application, in color as selected by the Architect.
- 2. Core to be 3/8" particleboard.
- 3. Backer sheet to be 0.015" aluminum.
- 4. Trim to be extruded aluminum, designed for concealed fastenings, clear anodized finish with chalk tray.
- 5. Sizes as shown on drawings; use maximum size available to eliminate seams. Where seams must be used, provide seaming diagram for Architect's acceptance.
- B. Manufacturers: Provide marker boards manufactured by Claridge Products and Equipment Inc., Arco Products, Inc. or Lemco.

### 2.2 TACKBOARDS

# A. Construction

- 1. Provide 1/4" thick vinyl-impregnated cork tackboards in color as selected by the Architect.
- 2. Provide 1/4" thick fiberboard core.
- 3. Trim to be extruded aluminum designed for concealed fastenings, clear anodized finish.
- B. Manufacturers: Provide tackboards manufactured by Claridge Products and Equipment Inc., Arco Products, Inc. or Lemco.

### 2.3 ACCESSORIES

- A. Map Rail: Furnish map rail at top of each unit, unless otherwise indicated, with the following accessories for each map rail:
  - 1. Display Rail: Continuous cork approx. 2" wide, integral with map rail.
  - 2. End Stops: One at each end of map rails.
  - 3. Map Hooks: 2 for each 4' of map rail or fraction thereof.
  - 4. Map hooks with flexible metal clips: 2 for each 4' of map rail or fraction thereof.
  - 5. Flagholder: One for each room.
- B. Provide clips, anchors and fasteners required for complete installation.

### 2.4 FABRICATION

- A. Assembly: Provide factory-assembled marker board and tackboard units unless field-assembled units indicated.
- B. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.
  - Provide manufacturer's standard vertical joint system between abutting sections of marker board.
  - 2. Provide mullion trim at joints between marker board and tackboards.

# PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where marker boards and tackboards are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

A. Deliver factory-built marker board and tackboard units completely assembled in one piece without joints, whenever possible. Where dimensions exceed panel size, provide 2 or more pieces of equal length as acceptable to the Architect. When overall dimensions require delivery in separate units, prefit at factory, disassembled for delivery, and make final joints at site. Use splines at joints to maintain surface alignment.

- B. Install units in locations and mounting heights as shown on drawings and in accordance with manufacturer's instructions, keeping perimeter lines straight, plumb and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim and accessories for complete installation.
- C. Coordinate job-assembled units with grounds, trim and accessories. Join all parts with neat, precision fit.

### 3.3 ADJUST AND CLEAN

- A. Verify accessories required for each unit properly installed and operating units properly functioning.
- B. Clean units in accordance with manufacturer's instructions, breaking in only as recommended.

**END OF SECTION** 



#### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the signage as shown on the drawings and/or specified herein, including, but not necessarily limited to, the following:
  - 1. Room identification signs.

- 2. Interior directional and door signage.
- 3. Fire egress, floor, and other signs required by Code.
- 4. Interior decorative pin-on-metal lettering.
- 5. Interior vinyl lettering and graphics applied to glass walls and other surfaces.

### 1.3 RELATED SECTIONS

A. Exit signs - Division 26.

### 1.4 QUALITY ASSURANCE

A. For actual installation of the interior panel signs, use only personnel who are thoroughly familiar with the manufacturer's recommended methods of installation and who are completely trained in the required skills.

### 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each sign showing finishes, colors, surface textures and qualities of manufacture and design of each sign component, including graphics.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of signs. Include plans, elevations, and large scale details of sign wording and lettering layout. Show anchorage and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

### 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

### PART 2 PRODUCTS

### 2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer: The design for each sign is based on products manufactured by Systech Signage Technology, Londonderry, VT 05148, Telephone: 800-807-1931, Fax: 800-871-1346, Web Site: <a href="www.systech-signage.com">www.systech-signage.com</a>. Subject to

- compliance with requirements, provide either the named product or a comparable product by one (1) of the following manufacturers.
- B. Alumigraph by AGS; Exton, PA 19431; Telephone: 866-388-2542; Fax: 610-363-7029; Web Site: www.alumigraph.com.
- C. Infonorm by Sign Design Group of New York, Long Island City, NY 11101, Telephone: 718-786-1108, Web Site: www.sdgny.com.

### 2.2 PANEL SIGNS

- A. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner, manufactured from aluminum sheet, unframed. Comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.
- B. Graphic Content and Style: Provide sign copy that complies with the requirements indicated for size, style, spacing, content, position, material, of letters, numbers, and other graphic devices.
- C. Tactile Characters: Characters and Grade 2 Braille raised 1/32 inch above surfaces, in contrasting color.
- D. Material: Aluminum sheet, 0.050 inch, ASTM B 209, alloy and temper to suit finish type.

# 2.3 LETTERING

- A. Metal Pin-On Lettering: 4" high, stainless steel.
- B. Vinyl Adhered Graphics and Lettering: Applied to gypsum wallboard, column covers, and to glass.

### 2.4 FINISHES

A. Colors and Surface Textures: For exposed sign material that requires selection of materials with integral or applied colors, surface textures, or other characteristics related to appearance, provide colors and surface textures as selected by Architect.

### PART 3 EXECUTION

# 3.1 INSPECTION

A. Examine the areas and conditions where signs are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not

proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

# 3.2 INSTALLATION

- A. Install units and components at the locations directed by the Architect, securely mounted with concealed theft-resistant fasteners. Attach to substrates in accordance with the manufacturer's instructions.
- B. Install level, plumb, and at the proper height. Cooperate with other trades for installation of sign units to finish surfaces. Repair or replace damaged units as directed by the Architect.

**END OF SECTION** 

#### PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. The Work of this Section includes all labor, materials, equipment, and services necessary to complete the toilet partitions as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Floor mounted stainless steel toilet partitions.
  - 2. Hardware and accessories.

### 1.3 RELATED SECTIONS

- A. Gypsum Drywall Section 092900.
- B. Ceramic Tiling Section 093013.

- C. Acoustical Panel Ceilings Section 095113.
- D. Toilet Accessories Section 102813.

#### 1.4 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to fabrication to ensure proper fitting of the work.
- B. Inserts and Anchorages: Furnish inserts and anchoring devices which must be built into other work for the installation of toilet partitions and related work. Coordinate delivery with other work to avoid delay.

### 1.5 SUBMITTALS

- A. Product Data: For recycled content, indicating post-consumer and pre-consumer recycled content and cost.
- B. Product Certificates: For regional content, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost.
- C. Product Data: For field-applied repair paints, indicating VOC content.
- D. Shop Drawings: Before any of the materials of this Section are delivered to the job site, submit the following:
  - 1. Room layouts and elevations for all areas, with dimensions based on actual dimensions taken at job site.
  - 2. Materials, finishes, details of construction, gauges of metal, hardware, fastening and anchoring conditions and relation to adjoining constructions.
- E. Samples: Submit the following:
  - 1. Stainless steel finish 12" x 12" sample.
  - 2. One sample of each type of hardware and fitting item including related fasteners. Include all items listed under 2.2 C. below.
- F. Templates: Submit templates to other trades as required for support of toilet partitions.

#### PART 2 PRODUCTS

# 2.1 MANUFACTURERS

- A. Provide floor mounted, stainless steel toilet partitions and wall-hung, stainless steel urinal screens as manufactured by Hadrian Manufacturing, Accurate Partitions or Knickerbocker Partition Corp.
  - 1. Manufacturer's name or identifying markings not permitted on exposed surfaces of toilet partitions, urinal screens or related hardware.

#### 2.2 MATERIALS

- A. Stainless Steel Sheet: Prime quality stainless steel, cold rolled, stretcher leveled, conforming to ASTM A 666, Type 316, with No. 4 brushed, vertical finish on exposed faces.
- B. Core Insulation: Manufacturer's standard rot-proof and vermin-proof double faced honeycomb or corrugated type core material; required in all panels, screens, pilasters and doors.
- C. Hardware: Chrome plated zinc die castings or stainless steel (Type 302 or 304), as indicated below. Stamped, cast alloy, or aluminum extrusions shall not be accepted.
  - 1. Pilaster Shoes: Stainless steel, one piece (no visible joints or seams) flush or offset design, 3" high, twenty (20) gauge.
  - 2. Hinges: Gravity hinge type, self-closing, concealed within door, fully adjustable, to bring door to rest in thirty (30) degree open position. Hinge brackets solid stainless steel, with solid stainless steel pin and pintles.
  - 3. Latch: Chrome plated zinc die castings with solid stainless steel slide.
  - 4. Strike and Keeper: One piece, sixteen (16) gauge stainless steel, with rubber bumper mechanically applied and theft proof.
  - 5. Bumper Coat Hook: Chrome plated zinc die castings, with ferrule held rubber bumper on back of each toilet compartment door.
  - 6. Stirrup Brackets: Fourteen (14) gauge stainless steel.
  - 7. Hardware Finishes
    - a. On Chrome Plated Zinc Die Castings: No. 4 brushed finish.
    - b. On Stainless Steel: No. 4, Satin Finish.
- D. Fasteners: Provide exposed fasteners of stainless steel or chromium plated brass, same finish as adjoining metal, theft proof. Provide concealed fasteners of non-corrosive metal.
- E. Furnish galvanized steel anchorage devices, complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters, to permit structural connection at floor. Furnish shoe at each pilaster to conceal anchorage.

### 2.3 FABRICATION

- A. Minimum Acceptable Metal Gauges:
  - 1. Face Sheets for Panels, Screens and Doors: 22 gauge stainless steel.
  - 2. Face Sheets for Pilasters: 18 gauge stainless steel.
  - 3. Edge Moldings: 18 gauge stainless steel.
  - 4. Concealed Reinforcement
    - a. For Tapping: 14 gauge galvanized steel.

b. For Anchoring Devices: 12 gauge galvanized steel.

#### B. Thicknesses

- 1. Panels, Screens and Doors: 1" overall thickness.
- 2. Pilasters: 1-1/4" overall thickness.
- C. Sizes: As shown on drawings. Pilasters for compartments shall all be of the same width, except end pilasters which shall be approximately 1/2 the normal width.

### D. Construction

- 1. Panels, screens, doors and pilasters shall have face sheets, with formed edges, pressure cemented to each side of core insulation, providing flat, smooth surface, free of waves, warping, buckles or other defects.
- Lock edges of face sheets together by either concealed tack welding face sheets at contacting edges at eight (8) inches o.c. and installing interlocking edge molding, or by using a combination integral edge molding and internal reinforcing channel epoxy bonded to face sheets.
- Edge molding shall have corners mitered, welded or brazed, ground flush and finished to match adjacent surfaces. Corners, caps or exposed welds not permitted.
- 4. Provide concealed reinforcement for hardware, grab bars, fastenings and accessories specified for in both work of this Section and in work of other Sections (such as Toilet Accessories), and for rigidity, strength and support of units in accordance with requirements of type and use of metal toilet partitions. Cut partitions in shop to receive toilet accessories, using templates furnished by Section 102813.
- E. Compartment Sizes: Unless otherwise indicated, minimum dimensions of components for toilet compartments shall be as follows:
  - 1. Enclosure Height: 5'-10".
  - 2. Typical Door Width: 2'-0".
  - 3. Door Width for Barrier Free Compartments: 2'-10".
  - 4. Door Height: 4'-10".
  - 5. Floor Clearance: 1'-0".

### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where floor mounted toilet partitions are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 INSTALLATION

- A. Install work of this Section in a rigid and permanent manner, straight and plumb, with all horizontal lines level.
- B. Install panels and doors twelve (12) inches above finished floor, unless otherwise indicated. Toilet compartment doors shall be centered on water closets, unless otherwise indicated.
- C. Maintain uniform clearance of approximately 1/2" between pilasters and panels, and 1/2" between pilasters or panels and finished wall.
- D. Maintain uniform clearance of 1/4" or less between vertical edges of doors and pilasters.
- E. Set pilaster units with anchorages having not less than two (2) inches penetration into structural floor. Level, plumb, and tighten installation with devices furnished. Hang doors and adjust so that tops of doors are level with tops of pilasters when doors are in closed position.

**END OF SECTION** 



### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

### 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the glazed metal partition system as indicated on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Full height, interior, unitized, single butt glazed, movable glass walls.

2. Factory fabricated metal framing system, glazing, seals, doors, mounting hardware and accessories necessary to complete the installation.

### 1.3 RELATED SECTIONS

- A. All Glass Doors Section 084228.
- B. Wood Doors Section 081416.
- C. Door Hardware Section 087100.
- D. Gypsum Drywall Section 0929200.
- E. Acoustical Panel Ceilings Section 095113.

### 1.4 REFERENCE

- A. The following standards are cited in this Section. They govern the work of this Section only to the extent specified in each citation.
- B. American National Standards Institute (ANSI):
  - Z97.1-1984 Safety Performance Specifications and Methods of Test for Glazing Materials used in Buildings.
- C. American Society for the Testing of Materials (ASTM):
  - 1. C864 Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacers.
  - 2. C1036 Specification for Flat Glass.
  - 3. E84 Surface Burning Characteristics.
- D. Flat Glass Manufacturers Association (FGMA):
  - 1. Glazing Manual.
  - 2. Sealant Manual.

### 1.5 PERFORMANCE REQUIREMENTS

- A. General: Provide and install wall systems from one manufacturer, such that it is capable of withstanding normal impact loads including loss or glass breakage attributable to the following: defective manufacture, fabrication, installation or other defects.
- B. Glass Design: Thickness minimum of low iron 1/2" tempered. Provide glass lites of various sizes for specific layout of vertical and horizontal framing members and as

- necessary to accommodate project conditions. Provide independent test data that indicates compliance of glass panels.
- C. All glass is to bear CPSC certified safety glazing labels indicating compliance with safety codes.
- D. Installer Qualifications: An experienced and manufacturer-trained installer shall be selected by the manufacturer and work under its guidance. Installer shall provide the appropriate certificates of insurance required by Owner and General Contractor.
- E. Adjustability: Wall system shall have leveling tolerance of +/- 5/8" at head and +/- 5/8" at floor to accommodate building tolerances for an overall height range of 2-1/2". Height of doors shall be adjusted to verified field dimension to reasonable undercuts (nominally ½").
- F. Manufacturer shall provide a variety of adjustable wall interface details that can adjust to building tolerances (plumb +/- 1/8" at frames to +/- 3/8" at panels).

### 1.6 SUBMITTALS

- A. Product Data: Submit for each type of product specified, including hardware and all framing members. Include installation methods for each type of product specified. Include installation methods for each type of ceiling and floor condition.
- B. Shop Drawings: Show layout and types of wall framing, relationship and attachment to adjacent construction. Indicate number, type and spacing of proposed fasteners.
- C. Samples: Submit duplicate samples of metal finish and glazing, and door finish, not less than 3" x 3" in size, showing the full range of variations expected.
- D. Surface-Burning Characteristics: Identify solid surface materials surface burning characteristics per ASTM E-84 and provide the appropriate testing.

### 1.7 QUALITY ASSURANCE

- A. Partition system shall be installed by manufacturer, or by a company approved by that manufacturer.
- B. Surface-Burning Characteristics: Provide a partition system with a flame spread of 25 or less, and smoke developed of 450 or less, as determined by testing identical products per ASTM E84 by UL or other testing and inspecting agencies acceptable to authorities having jurisdiction.
- C. Single Source Responsibilities: Obtain partition system from one source by a single manufacturer.
- D. Coordination of Work: Coordinate layout and installation of panel component with other units of work, including gypsum board work, ceilings, light fixtures, HVAC work, etc.

- E. Safety Glass: Comply with ANSI Z97.1.
- F. Glazier Qualifications: Minimum 10 years experience executing comparable work.
- G. STC rating of 42.

### 1.8 PROJECT CONDITIONS

A. Field Measurements: Check partition system layout by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid a delay in the Work.

### 1.9 DELIVERY, STORAGE, AND HANDLING

- A. Factory-pack products to protect them from weather and damage during delivery, storage, and handling. Remove wrappings after delivery, inspect products, and store them indoors in a dry, clean area that is free from corrosive fumes. Do not set products on ground or damp floors. Store products as required to protect them from dust and contaminants but allow air circulation between and around them.
- B. Furnish only glass that is labeled by the manufacturer. Keep glass dry. Store and handle it carefully to prevent edge damage, abrasion, and overstress.
- C. Seals: Furnish seals in unopened manufacturers containers. Labels shall show dates of manufacturer. Do not use material more than 6 months old.

## 1.10 WARRANTY

A. Manufacturer shall guarantee all materials and workmanship against defects of materials fabrication and installation for a period of one year from date of the completed installation.

# PART 2 PRODUCTS

### 2.1 MANUFACTURER

A. Profiles and details shown in the Architectural Drawings are those of Infinium Wall, "Refine" System (Basis of Design) unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are Maars "Horizon System" or Nordwall "Diva" System.

# 2.2 PANELS AND FRAMING

- A. Aluminum framing members shall be #6063-T6 aluminum, modular in size and factory assembled and glazed.
- B. Panels shall have 2" horizontal top and bottom rails, with 3/4" reveal at base and continuous ceiling channel. Base channel shall be unitized and spring loaded with locking set screws necessary to level each panel.

- C. Horizontal muntin rails, where required, are 1-1/16" high. See drawings for requirements.
- D. All vertical mullions at glass-to-glass and glass-to-door frame locations shall be a maximum of 1-1/8" wide.
- E. Finish of all framing shall be powder coated finish complying with AAMA 2603; basis-of-design color " White Dove."
- F. Typical vertical joints between glass shall be polycarbonate joining members, except where design shows vertical framing members.

### 2.3 GLASS INSERTS

A. 1/2" thick tempered, low-iron glass.

## 2.4 POWER, VOICE AND DATA SERVICES

- A. Provide 4" x 4" vertical aluminum posts between door frame and glass panels or between two glass panels to accommodate factory-installed cutouts for voice and data at any location where this is required in the design.
- B. Cutouts for Voice and Data: Cutout with temporary bezel and pull string.

#### 2.5 DOORS

- A. Door Types
  - 1. Butt hinges, mortise locks and closers. See Section 087100 for full list.
  - 2. All Glass Doors: See Section 084228.
- B. Type: Butt-hinged.
- C. Full height.
- D. Prepare mullions where doors are to be installed for installation of hardware specified for each door type.

# 2.6 DOOR HARDWARE

A. Provide hardware as indicated on drawings and hardware schedule.

## PART 3 EXECUTION

## 3.1 EXAMINATION

A. Examine the areas and conditions where glazed metal partition systems are to be installed and correct any conditions detrimental to the proper and timely completion of

the work. Do not proceed with the work until unsatisfactory conditions have been corrected by the Contractor in a manner acceptable to the Architect.

### 3.2 INSTALLATION

- A. Install wall system after floor coverings and suspended acoustical ceilings are completed. Coordinate work with other affected trades. Avoid damage to installed work.
- B. Install wall system work rigid, plumb, level, and true-to-line. Comply with manufacturer's instructions and recommendations for installation of panels and framing, door units, hardware, accessories, and other components. Provide proper support and anchor frames and fixed panels securely in place. Installation tolerance shall be no less than 1/8" (3mm) from the plane formed by the faces of adjacent panels.
- C. Install aluminum wall-starts and ceiling connections with correct seal to ensure proper acoustical performance.
- D. Install work without damaging adjoining construction, and with all evidence of drilling, cutting, and fitting concealed.
- E. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified under paragraph "Dissimilar Materials" in the Appendix of AAMA 101.
- F. Adjust hardware and leave doors in proper operating condition.

# 3.3 FIELD QUALITY CONTROL

A. Provide experienced supervision of all elements of the work of this Section.

### 3.4 ADJUSTING, CLEANING, AND PROTECTION

- A. Correct noncomplying and damaged work. Repair minor finish abrasions. Remove and replace work that cannot be satisfactorily corrected.
- B. Cleaning: Remove excess glazing materials and lubricants. Wash glass and adjacent surfaces to remove all traces of cleaning solvents, fingerprints, soil, dust, and other deposits.
  - 1. During construction, wash glass as often as necessary to keep it free of deposits that stain or etch glass or permanently affect its light transmission.
  - 2. Not more than four days before final inspection, wash all glass surfaces. Polish glass with soft, dry cloths.

- 3. Washings: Use only mild, non-abrasive non-alkaline cleaning solutions. Rinse thoroughly with cleaner. Protect adjoining and adjacent surfaces from water stains, deposits, and other damage.
- 4. Protect glass and glazing materials from damage and abuse. Do not post signs or make X's or other marks directly on glass.
- C. Protection: Protect wall system from damage.

**END OF SECTION** 



#### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the folding glass wall assembly as indicated on the drawings and/or specified herein.

### 1.3 RELATED SECTIONS

- A. Structural Steel Section 051200.
- B. Carpentry Section 062000, for wood blocking.
- C. Glass and Glazing Section 088000.

### 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product literature and installation instructions for each type of operable glass wall partition and installation accessory required.
- B. Shop Drawings: Submit shop drawings showing location and extent of operable glass wall partitions. Include plans, elevations, and large scale details of anchorages, and accessory items. Indicate location of each unit within building, conditions at openings, typical for special details, location and installation requirements for hardware and operators.
  - Include methods of installation for each type of support structure and fastening condition.
- C. Template Drawings: Submit location template drawings for items supported or anchored by permanent construction.
- D. Maintenance Data: Include complete Maintenance Manual.
- E. Samples for Verification Purposes
  - 1. 12" square samples of glass.
  - 2. Prepare samples from same material and finish to be used for the work.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm (material producer) with not less than three (3) years of production experience, whose published literature clearly indicates general compliance of products with requirements of this section.
- B. Installer Qualifications: Firm specializing in operable partition installation with not less than two (2) years of experience in installation of operable partitions similar to those required for this project.
- C. Single Source Responsibility: Provide material produced by a single manufacturer partitions and mounting hardware.

#### 1.6 REFERENCED STANDARDS

A. ASTM E 557: Practices for Architectural Application and Installation of Operable Partitions.

# 1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to project site in original factory wrappings and containers, clearly labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification, and lot number. Store materials in original undamaged packages and containers, inside well ventilated area protected from weather, moisture, soiling, extreme temperatures, humidity; laid flat, blocked off ground to prevent sagging and warping. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

# 1.8 SEQUENCING AND SCHEDULING

A. Sequence operable glass wall partition installation with other work to minimize possibility of damage and soiling during remainder of construction period.

### 1.9 WARRANTY

- A. This warranty shall be in addition to and not a limitation of other rights the Owner may have against the Contractor under the Contract Documents.
  - 1. Warranty period is two (2) years after the date of substantial completion.

## 1.10 MAINTENANCE

A. Maintenance Instructions: Submit manufacturer's printed instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under anticipated use conditions. Include precautions against materials and methods which may be detrimental to finishes and performances.

# PART 2 PRODUCTS

#### 2.1 OPERABLE GLASS WALL PARTITION SYSTEM

A. Operable glass wall shall be equal to Model No. FSW-G folding sliding glass wall with single-point fixings, top-supported, manually-operable system as manufactured by Modernfold, a Dorma Group Company, Profiles and details shown on the Architectural Drawings are those of Dorma Group Co. (Basis of Design) unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are Avanti Systems "Movere" Single Glazed operable walls, and NanaWall Frameless Glass Wall, single track folding, FSW75.

- B. Panels shall use 2-piece, clamp on top and bottom rails that fastens together from alternating sides.
- C. System consists of two (2) sections of folding wall, each with one end assembly and three folding panels; all equal in width. Provide locks for each section of wall in the open and closed positions of the wall.

### 2.2 CONSTRUCTION

- A. Provide top reinforcement as required to support panel from suspension components and provide reinforcement for hardware attachment. Fabricate panels with concealed fasteners. Finished in-place partition shall be rigid, level, plumb, aligned with uniform joints and appearance; free of bow, warp, twist, deformation, surface and finish irregularities.
- B. Dimensions: Fabricate operable glass panel partitions to form an assembled system of dimensions indicated on Drawings, and verified by field measurements.
- C. Top and Bottom Rails: Continuous two-piece assemblies with removable end caps. Rails fasten together from alternate sides of partition allowing for field adjustment to job site conditions. Snap-on covers are furnished to facilitate installation.
- D. Bottom Rail Locking System: Floor bolts are used to stabilize panels from movement in all directions.

## 2.3 MATERIALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use, corrosion resistance, and finish indicated; ASTM B 221 for extrusions; manufacturer's standard strengths and thicknesses for type of use.
- B. Glass: Compliant with safety standards specified in ANSI Z97.1 CPSC16, CFR1201, ASTM C 1036 and ASTM C 1048; provide 1/2" clear, low-iron tempered glass meeting requirements of Section 088000, "Glass and Glazing."

## 2.4 PANEL FINISH

A. Provide top and bottom fittings fabricated of clear satin anodized aluminum.

## 2.5 SUSPENSION SYSTEM

- A. G-150 Suspension System
  - 1. Suspension Tracks: Extruded aluminum with a minimum wall thickness of 0.235 inches. Incorporate cast aluminum or mitered intersections, switches, and curves in stacking area. Provide alignment pins for track, intersections, switches and curves insuring both fit and roller surface integrity.

- a. Exposed Track Soffit: Factory-finished aluminum with white powder coat.
- 2. Carriers: Two stainless steel trolleys with vinyl roller surfaces. Trolley design incorporates eight (8) wheels of varying dimensions. Automatic indexing of panels into stack area is provided by pre-programmed switches and trolleys without electrical, pneumatic, or mechanical activation.

### PART 3 EXECUTION

## 3.1 INSTALLATION

- A. General: Comply with ASTM E 557, operable glass partition manufacturer's written installation instructions, Drawings, and approved Shop Drawings.
- B. Install operable glass partitions and accessories after other finishing operations, including painting, have been completed.
- C. Match operable glass partitions by installing panels from marked packages in numbered sequence indicated on Shop Drawings.
- D. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.

### 3.2 CLEANING AND PROTECTION

- A. Clean metal and glass surfaces upon completing installation of operable glass partitions to remove dust, loose fibers, fingerprints, adhesives, and other foreign materials according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer that insure operable glass partitions are without damage or deterioration at time of Substantial Completion.

## 3.3 ADJUSTING

A. Adjust operable glass partition to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

## 3.4 EXAMINATION

A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable glass partitions. Proceed with installation only after unsatisfactory conditions have been corrected by the Contractor.

1. Insure finished floor under operable glass partition must be level  $\pm$  0.13-inch in ten (10) feet non-cumulative.

# 3.5 DEMONSTRATION

- A. Demonstrate proper operation and maintenance procedures to Owner's representative.
- B. Provide Operation and Maintenance Manual to Owner's representatives.

**END OF SECTION** 

#### PART 1 GENERAL

#### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the toilet accessories as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Mirrors.
  - 2. Shower sundries shelf.
  - 3. Electric hand dryer.
  - 4. Sanitary napkin dispenser and disposal units.
  - Grab bars.

- 6. Shelf and hook strip for Janitor's Closets.
- 7. Shower curtains and ceiling tracks.
- 8. Towel hooks.
- 9. Folding ADA benches.
- B. Owner Furnished Contractor installed Accessories
  - 1. Wall Mounted Soap Dispenser.
  - 2. Toilet paper holder.

#### 1.3 RELATED SECTIONS

- A. Unit Masonry Section 042000.
- B. Gypsum Drywall Section 092900.
- C. Ceramic Tiling Section 093013.
- D. Toilet Partitions Section 102113.

### 1.4 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units. Accessories shall be installed at heights in compliance with prevailing Handicapped Code.
- C. Products: Unless otherwise noted, provide products of same manufacturer for each type of unit and for units exposed in same areas.

## 1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data, catalog cuts and installation instructions for each toilet accessory.
- B. Setting Drawings: Provide setting drawings, templates, instructions, and directions for installation of anchorage devices in other work
- C. Submit schedule of accessories indicating quantity and location of each item.

# 1.6 PRODUCT HANDLING

A. Deliver accessories to the site ready for use in the manufacturer's original and unopened containers and packaging, bearing labels as to type or material, manufacturer's name and brand name. Delivered materials shall be identical to approved samples.

### PART 2 PRODUCTS

#### 2.1 MATERIALS

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gauge minimum, unless otherwise indicated.
- B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.
- C. Galvanized Steel Sheet: ASTM A 653, G60.
- D. Chromium Plating: Nickel and chromium electro-deposited on base metal, ASTM B 456, Type SC 2.
- E. Mirrors: ASTM C 1503, mirror glazing quality, clear glass mirrors, nominal 1/4" thick.

### 2.2 FASTENING DEVICES

- A. Exposed Fasteners: Theft-proof type, chrome plated, or stainless steel; match finishes on which they are being used.
- B. Concealed Fasteners: Galvanized (ASTM A 123) or cadmium plated.
- C. No exposed fastening devices permitted on exposed frames.
- D. For metal stud drywall partitions, provide ten (10) gauge galvanized sheet concealed anchor plates for securing surface mounted accessories.

### 2.3 FABRICATION

- A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted. Unobtrusive labels on surfaces not exposed to view are acceptable. Where locks are required for a particular type of toilet accessory, provide same keying throughout project. Furnish two keys for each lock.
- B. Surface-Mounted Toilet Accessories, General: Fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage.
- C. Recessed Toilet Accessories, General: Fabricate units of all welded construction, without mitered corners. Hang doors of access panels with full-length stainless steel piano hinge. Provide anchorage that is fully concealed when unit is closed.

# 2.4 MANUFACTURERS

A. Provide products manufactured by Bobrick Washroom Equipment Co., American Specialties, Inc., Bradley Corp., or A & J Washroom Accessories and Excel Dryer Inc..

#### 2.5 ACCESSORY SCHEDULE

A. As selected by the Architect.

#### PART 3 EXECUTION

#### 3.1 INSPECTION

A. Examine the areas and conditions where toilet accessories are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

#### 3.2 PREPARATION

- A. Accessories that are to be partition mounted shall be closely coordinated with other trades, so that the necessary reinforcing is provided to receive the accessories.
- B. Furnish templates and setting drawings and anchor plates required for the proper installation of the accessories at gypsum drywall and masonry partitions. Coordinate the work to assure that base plates and anchoring frames are in the proper position to secure the accessories.
- C. Verify by measurements taken at the job site those dimensions affecting the work. Bring field dimensions that are at variance with those on the approved shop drawings to the attention of the Architect. Obtain decision regarding corrective measures before the start of fabrication of items affected.
- D. Cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

#### 3.3 INSTALLATION

- A. Install accessories at locations indicated on the drawings, using skilled mechanics, in a plumb, level and secure manner.
- B. Concealed anchor assemblies for gypsum drywall partitions shall be securely anchored to metal studs to accommodate accessories. Assemblies shall consist of plates and/or angles tack welded to studs.
- C. Secure accessories in place, at their designated locations by means of theft-proof concealed set screws, so as to render removing of the accessory with a screwdriver impossible.
- D. Unless otherwise indicated, accessories shall conform to heights from the finished floor as shown on the drawings. Where locations are not indicated, such locations shall be as directed by the Architect.
- E. Installed accessories shall operate quietly and smoothly for use intended. Doors and operating hardware shall function without binding or unnecessary friction. Dispenser type accessories shall be keyed alike. Prior to final acceptance, master key and one duplicate key shall be given to Owner's authorized agent.
- F. The Architect shall be the sole judge of workmanship. Workmanship shall be of the highest quality. Open joints, weld marks, poor connections, etc., will not be permitted. The Architect has the right to reject any accessory if he feels the workmanship is below the standards of this project.

G. Grab bars shall be installed so that they can support a three hundred (300) lb. load for five minutes per ASTM F 446.

## 3.4 CLEANING AND PROTECTION

- A. Upon completion of the installation, clean accessories of dirt, paint and foreign matter.
- B. During the installation of accessories and until finally installed and accepted, protect accessories with gummed canvas or other means in order to maintain the accessories in acceptable condition.
- C. Replace and/or repair, to the Owner's satisfaction, and at no additional cost to the Owner, installed work that is damaged or defective.

**END OF SECTION** 



## PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
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  - b. Implementation of a Construction Indoor Air Quality Management Plan.
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  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the lockers as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Steel wardrobe lockers.

2. Trim, closures, anchors and accessories.

## 1.3 RELATED SECTIONS

A. Concrete slab - Section 033000.

## 1.4 QUALITY ASSURANCE

- A. Qualifications of Installers: For installation of lockers, use only personnel who are thoroughly trained and experienced in the skills involved and who are completely familiar with the manufacturer's recommended methods of installation.
- B. Uniformity: Provide each locker as produced by a single manufacturer, including necessary mounting accessories, fittings and fastenings.

## 1.5 SUBMITTALS

- A. Shop Drawings: Before any materials of this Section are delivered to the job site, submit complete shop drawings, technical data and installation instructions to the Architect. Shop drawing must show method of installation, fillers, trim and accessories. Include locker sequencing information.
- B. Samples: Submit 6" x 6" samples of manufacturer's standard finish.

## 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

# PART 2 PRODUCTS

### 2.1 MANUFACTURER

A. Provide triple tier and double tier 12" x 18" x 72" steel lockers, closed base, slope top, equal to "Traditional Collection" manufactured by ASI Storage Solutions, subject to compliance with requirements specified, other acceptable manufacturers are Penco Products and Republic Steel

# 2.2 MATERIALS

A. Sheet Steel: Mild cold-rolled and leveled steel, free from buckle, scale, and surface imperfections.

## 2.3 FABRICATION, GENERAL

- A. Construction: Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Make all exposed metal edges safe to touch. Weld or rivet connections; bolted connections not permitted. Grind exposed welds flush. Do not expose rivet heads on fronts of locker doors or frames.
- B. Finishing: Chemically pretreat metal with degreasing and phosphatizing process. Apply baked-on enamel finish to all surfaces, exposed and concealed, except plates and non-ferrous metal.
  - 1. Color: Provide locker units in color(s) as selected by Architect from manufacturer's standards. Concealed parts may be manufacturer's standard neutral color.
- C. Door Frames: Frames shall be 16 gauge formed in a channel shape. Vertical members shall have additional flange to provide a continuous door strike. Cross frame members shall also be 16 gauge channel shaped, including intermediate cross frames on double and triple tier lockers.
- D. Doors: Doors shall be 16 gauge, with louvers for ventilation; channel shaped on both the lock and hinge side, with angle formations across the top and bottom.
- E. Body: Bottoms shall be 16 gauge. Tops, sides, backs, and shelves shall be 24 gauge. Bolt spacing shall not exceed 9" o.c.
- F. Hinges: Hinges shall be full length 16 gauge continuous piano type riveted to both door and frame.
- G. Handles: Handles shall be one-piece 20 gauge deep drawn stainless steel cup designed to accommodate locks.
- H. Latching: Lifting trigger shall be 14 gauge steel, attached to the latching channel. The trigger shall have a padlock eye for use with 9/32" diameter padlock shackle. Doors to have latch clip engaging frame at three points on doors over 42" high and two points on all other doors. Locking device to be positive automatic type, whereby locker door may be locked when open, then closed without unlocking. A rubber silencer shall be firmly secured to the frame at each latch hook.

### 2.4 LOCKER ACCESSORIES

- A. Equipment: Furnish each locker with hat shelf, hang rod, and not less than 2 single-prong wall hooks. Middle tier locker shelving shall be ADA accessible (min. 15" a.f.f., max. 48" a.f.f.).
- B. Number Plates: Manufacturer's standard etched, embossed, or stamped, non-ferrous metal number plates with numerals not less than 3/8" high. Number lockers in

- sequence as directed by Architect. Attach plates to each locker door, near top, centered, with at least 2 fasteners of same finish as number plate.
- C. Continuous Sloping Tops: Not less than 20 ga. sheet steel, approx. 25 degree pitch, in lengths as long as practicable but not less than 4 lockers. Provide closures at ends. Finish to match lockers, unless otherwise indicated.
- D. Filler Panels: Provide filler panels where required of not less than 16 ga. steel sheet, factory-fabricated and finished to match locker units.

#### PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where lockers are to be installed, and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

# 3.2 INSTALLATION

- A. Install metal lockers at locations shown in accordance with manufacturer's instructions for plumb, level, rigid and flush installation.
- B. Space fastenings 36" o.c. and apply through back-up reinforcing plates where necessary to avoid metal distortion; conceal all fasteners.
- C. Install trim, sloping top units, and metal filler panels using concealed fasteners to provide flush, hairline joints against adjacent surfaces.

### 3.3 ADJUST AND CLEAN

- A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
- B. Touch-up marred finishes, but replace units which cannot be restored to factoryfinished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

## **END OF SECTION**

### PART 1 GENERAL

### 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse.
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the exterior sun control devices as shown on the drawings and/or specified herein.

## 1.3 RELATED SECTIONS

A. Architecturally-Exposed Structural Steel - Section 051210.

- B. Joint Sealers Section 079200.
- C. Glazed Aluminum Curtain Walls Section 084413.

#### 1.4 SUBMITTALS

- A. Product Data: Submit specifications, data, and installation, instructions from the manufacturer of sunshades.
- B. Shop Drawings: For exterior sunshades and accessories. Include plans; elevations; sections; and details showing profiles, angles, and spacing of blades, frames and supports. Show unit dimensions related to supporting and adjoining structures and construction. Indicate anchorage details and locations.
- C. Structural Calculations shall be stamped and signed by a professional engineer registered in the jurisdiction where the project is located.
  - Weld Calculations: Manufacturer shall submit calculations demonstrating that fillet welds produced with the Pulsed Gas Metal Arc Welding (GMAW/MIG) process will withstand a minimum of 526 lbs of force in shear.
- D. Weld Strength Calculations: Stamped and signed by a professional engineer specializing in the application of welding technology.
- E. Samples For Initial Selection: Manufacturer's color charts showing full range of colors available for devices with factory-applied color finishes.
- F. Samples For Verification: Of each type of metal finish required, prepared on samples of same thickness and material indicated for final Work. Where finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
- G. Warranty: Provide written warranty to the Owner that all screen products will be free of defective materials or workmanship for a period of one year from date of installation.

## 1.5 QUALITY ASSURANCE

- A. Single Subcontract Responsibility: Subcontract the work to a single firm that has had not less than ten years in the successful fabrication and installation of work similar to that shown and required.
- B. Performance Requirements: Design sunshades to accommodate local building code requirements for snow and wind loading. Provide engineering calculations to support design. Calculations to be by a registered engineer licensed in the state that the project is located.

## PART 2 PRODUCTS

## 2.1 PRODUCTS

A. Manufacturers: Subject to compliance with requirements, provide products as manufactured by the Airolite Company, Construction Specialties, or Hunter Douglas or ASCA Inc. Architectural Sun Control.

### 2.2 MATERIALS

- A. Aluminum Extrusions: ASTM B 211, Alloy 6063-T5 or T52.
- B. Aluminum Sheet: ASTM B 209, alloy 3003, or 5005 with temper as required for forming, or as otherwise recommended by metal producer to produce finish.
- C. Fasteners: Of same basic metal and alloy as fastened metal or 300 series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
  - 1. Use types and sizes to suit unit installation conditions.
  - 2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.
- D. Anchors and Inserts: Of type, size and material required for loading and installation indicated. Use nonferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as needed for corrosion resistance.
- E. Bituminous Paint (if required): Cold-applied asphalt mastic complying with SSPC-Paint 12, but containing no asbestos fibers; or cold-applied asphalt emulsion complying with ASTM D 11 87.
- F. Steel Components: Provide steel reinforcements as necessary to meet performance requirements. Concealed steel anchors and reinforcing shall be factory painted after fabrication.

# 2.3 SUNSHADES

- A. Basis-of-Design Product: The Airolite Company; horizontal, fixed, extruded aluminum sunshade consisting of custom outriggers and airfoil blades as indicated on the drawings, anchored directly to structural steel Subject to compliance with requirements, or products from Construction Specialties, Colt International or OGI Architectural Metal Solutions.
- B. Blade Design: 6063-T5 alloy extruded aluminum.
  - 1. Airfoil Blade: 12" blade by 2.631" width; and 8" blade by 1.5" width; 0.125" nominal thickness, installed as indicated on the drawings.
  - 2. Outrigger Profile: As indicated on the drawings.

## 2.4 FABRICATION, GENERAL

- A. Provide fixed sunshades and accessories of design, material, sizes, depth, arrangement, and thickness as indicated or as required for optimal performance with respect to strength; durability; and uniform appearance.
- B. Systems using individual field fabricated or field assembled members are not acceptable, unless necessitated by shipping, distribution or erection constraints.
- C. Fabricate to allow for thermal movement of materials when subjected to a temperature differential from -10°F to +180°F without damage.
- Sun shade design shall incorporate provisions for ease of alignment and adjustment during installation.
- E. Assemble all-welded sun control assemblies in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- F. Sun control assemblies shall be assembled entirely by welding. Components shall be joined with a minimum of two fillet welds, each 1" long, produced with the Pulsed Gas Metal Arc Welding (GMAW/MIG) process with minimum 0.125" throat.
- G. Maintain equal sun control blade spacing per drawings, including separation between blades and frames to produce uniform appearance.
- H. Include supports, anchorages and accessories required for complete assembly.
- I. Join frame members to one another and to fixed sun control blades with fillet welds concealed from view, unless size of sun control assembly makes concealed bolted connections between frame members necessary.

## 2.5 FINISHES

# A. General

- 1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- 2. Finish sun controls after assembly.
- B. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: Cleaned with inhibited chemicals; Chemical Finish: Acid-chromate-fluoride-phosphate conversion coating; Organic Coating: As specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer's written instructions.
  - Fluoropolymer Two-Coat System: Manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color

topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605-98.

2. Custom color and gloss as per the drawings.

### PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the openings to receive the work. Do not proceed until any unsatisfactory conditions have been corrected.

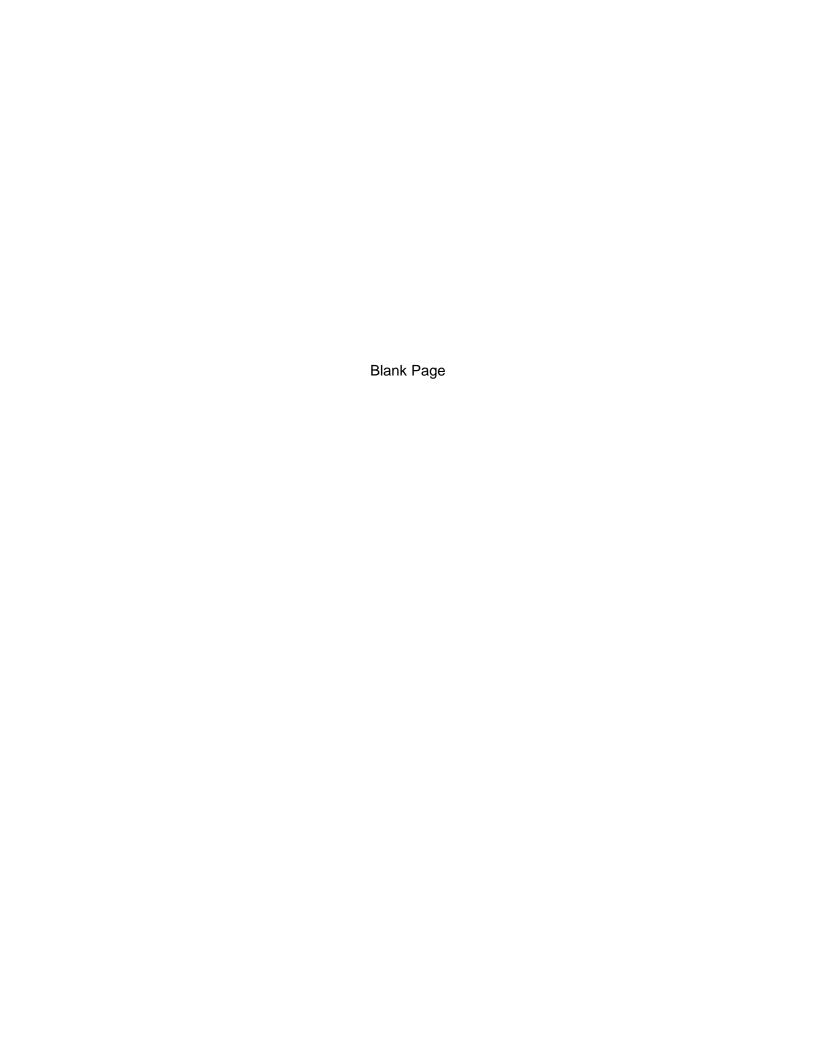
## 3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of the work
  - 1. Verify dimensions of supporting structure at the site by accurate field measurements so that the work will be accurately designed, fabricated and fitted to the structure.
  - 2. Anchor sunscreen to building substructure as indicated on architectural drawings.

#### B. Erection Tolerances

- 1. Variation From Level: <u>+</u> 1/8" maximum in any column to column space or 20'-0" runs, non-cumulative.
- 2. Offsets in end-to-end or edge-to-edge alignment of consecutive members 1/32".
- C. Cut and trim component parts during erection only with the approval of the manufacturer or fabricator, and in accordance with his recommendations. Restore finish completely. Remove and replace members where cutting and trimming has impaired the strength or appearance of the assembly as directed.
- D. Do not erect warped, bowed, deformed or otherwise damaged or defaced members. Remove and replace any members damaged in the erection process as directed.
- E. Set units level, plumb and true to line, with uniform joints.

**END OF SECTION** 



## PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

## 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment and services necessary to complete the loading dock equipment as shown on the drawings and/or specified herein, including but not necessarily limited to the following:
  - 1. Dock bumpers.

## 1.3 RELATED SECTIONS

A. Cast-in-place concrete - Division 3.

#### 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for loading dock equipment, including installation details and operating instructions.
- B. Test Reports: Submit certified test reports showing compliance with ANSI MH 30.1 requirements for rated capacity.
- C. Shop Drawings: Submit plans, elevations and details for fabrication and erection of dock levelers. Show anchorages and accessory items. Provide template drawings for items on or anchored to concrete. Furnish roughing in drawings for electrical service.
- D. Maintenance Data: Submit manufacturer's maintenance and service data, including address and telephone number of nearest authorized service representative.

## PART 2 PRODUCTS

#### 2.1 DOCK BUMPERS

- A. Profiles and details shown on the drawings are those of Pentalift Equipment Corporation unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are The Kelly Company- 4Front Engineering Solutions and McGuire.
- B. Laminated Tread Bumpers: Provide Model PLBXXX by Pentalift Equipment Corporation. See drawings for bumper sizes.
- C. Anchorage Devices: Provide anchor bolts, nuts, washers, bolts, sleeves, cast-in-place and other anchorage devices as required to fasten bumpers securely in place and to suit installation indicated. Furnish anchorage components which are hot dip galvanized.

## PART 3 EXECUTION

### 3.1 INSPECTION

A. Examine the areas and conditions where loading dock equipment is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

### 3.2 PREPARATION

A. Coordinate and furnish anchorages with templates, diagrams, and instructions for their installations, for loading dock equipment to be attached to or recessed into concrete.

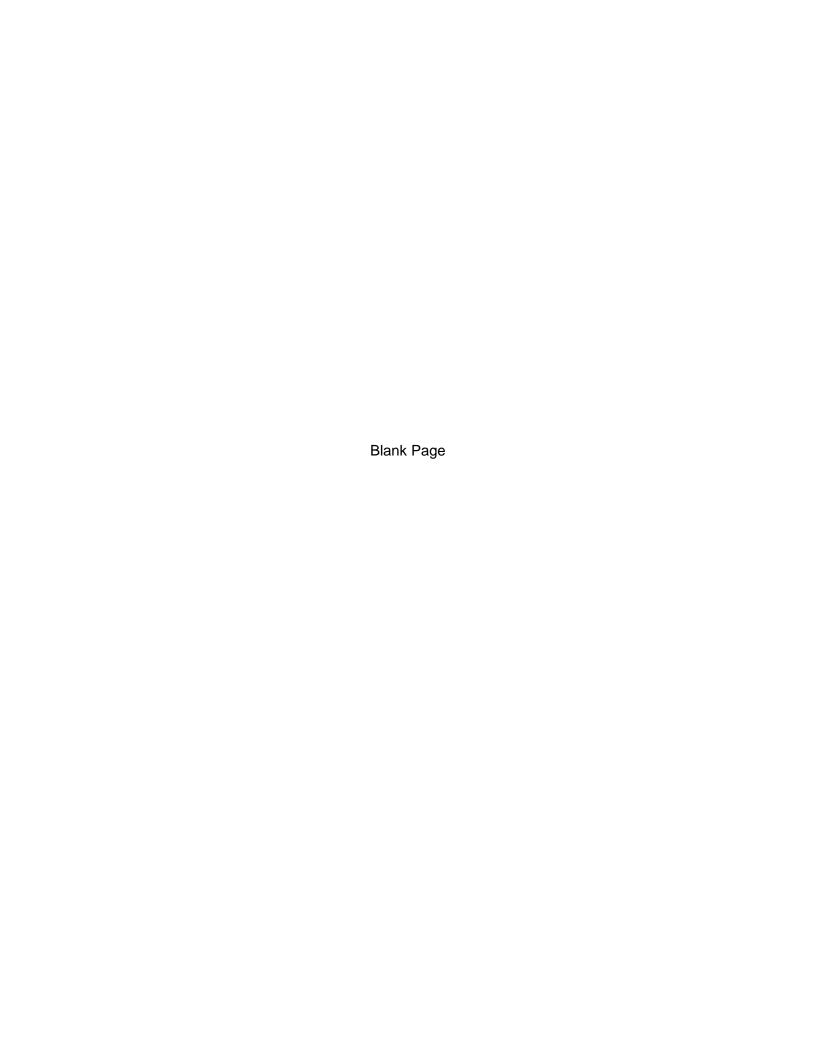
# 3.3 INSTALLATION

- A. General: Comply with manufacturer's detailed instructions in installing loading dock equipment.
- B. Dock Bumpers: Attach dock bumpers to structure to comply with requirements indicated for spacing, arrangement, position relative to top of platform, and anchorage.
  - 1. Bolted Attachment: Attach to embedded anchor bolts or to cast in place inserts, or attach by drilling and anchoring with expansion anchors and bolts.

## 3.4 ADJUST AND CLEAN

A. After installation, restore marred or abraded surfaces to original condition.

**END OF SECTION** 



# PART 1 - GENERAL

## 1.1 GENERAL REQUIREMENTS

A. Work of this Section shall conform to the requirements of the Contract Documents.

## 1.2 BIDS

- A. Custom fabricated equipment must be built by a company continually in business for at least a 5-year period.
- B. Contract documents convey a method of construction for custom fabrication; however this may or may not be the appropriate method based on selected fabricators industry knowledge and standards. It will be the responsibility of the selected fabricator to interpret and apply appropriate methods of construction for full functionality of custom fabrication.
- C. Bids must be based on equipment of manufacturers specified; no substitution will be accepted after award of Contract.
- D. Substitutions: When a product or material is specified by name and or model number, as noted in these specifications, such specifications establishes the standard type and quality considered most satisfactory for the particular purpose in the building. The bid proposal therefore should be based thereon, so that all bidders bid under the same conditions. Another product or material of the same type that meets the requirements may be submitted for consideration as a substitute only under the following conditions:
  - Requests for substitution must be submitted in writing at least ten (10) days before the date set for the receipt of bids for review and approval by the design professional. If the substitution is found to be equivalent, all bidders will be notified prior to the receipt of bids.
  - In providing substitution requests, the bidder must prove equivalence of the substitution and furnish detailed specifications and catalog cuts or drawings. Failure to identify exceptions or deviations from equipment specified must be interpreted to indicate that the product offered complies with the specification in every respect.
- E. Owner, Architect and Food Service Consultant reserves right to waive any informality, or reject any or all bids and any parts thereof, or to accept that bid as a whole or part that in his judgment is for the best interest of Owner. All bids to have on Contractor's letterhead itemized cost of each item of equipment, otherwise bid will be rejected.

## 1.3 WORK INCLUDED

- A. Cooperate in every way with other contractors in order that whole installation may result in the highest grade possible.
- B. Only such valves, traps, faucets, shut-offs, reducing pressure valves, relief valves and other specialty items required within equipment and as hereinafter specified, included in this work.
- C. Make all necessary cut-outs and knock-outs where required on equipment to accommodate electrical receptacles, switches or other electrical outlets and equipment, together with such cut-outs as required for passage of gas or plumbing piping, etc.
- D. Stack and remove rubbish waste material, crating, etc., resulting from work and keep the premises clean at all times. Upon completion of the installation, thoroughly and finally clean all equipment ready for use.

### 1.4 POWER AVAILABLE

- A. Electric Voltage: 120/208/480 volt, 60 cycle, 1 & 3 ph.
- B. Water Pressure: Typical Food Service Equipment range 25 to 90 PSI, if required, pressure reducing valves provided by plumbing contractor.
- C. Temperature: 120° Fahrenheit max at hand washing and work sinks. 140° Fahrenheit max at pot sink and dishwashers.
- D. Gas: 6" W.C. min 8" W.C. max.

## 1.5 GENERAL CHARACTERISTICS OF EQUIPMENT

# A. Electrically Operated

- 1. Electrically operated equipment: listed by Underwriters Labs., Inc.
- 2. Motors: up to and including 1/2 h.p., shall be 120/60/1
- 3. Motors: over 1/2 h.p., 208/60/3, or as otherwise indicated
- 4. Ranges, food warmers, etc., over 1.5 k.w., 208/60/3, unless otherwise specified
- 5. Electrically heated equipment, etc., 1.5 k.w. and under, 120/60/1
- 6. 1 ph. electrical plug-in units with 3 wire cords; 3 wire cap
- 7. 3 ph. electrical plug-in units with 4 wire cords; 4 wire cap
- 8. Motor driven equipment: equipped with starting switch
- 9. Motors: equipped with overload protection
- 10. Wiring on fixtures, including operating switches and pilots, furnished by Kitchen Equipment Contractor.

- B. Submit in writing to Architect and Food Service Consultant for approval, schedule showing proposed electrical characteristics of each piece of equipment and disconnect means provided.
- C. Punch holes for, and install hood and walk-in cooler/freezer lights and concealed conduits. The interconnection of same, including control switch, wiring, etc., by Electrical Contractor.

### 1.6 WORK EXCLUDED FROM THIS DIVISION

A. The following work in conjunction with Food Service Installation, done by others.

### 1. Electrical Contractors

- a. Make connections to all food service equipment as shown.
- b. Furnish disconnect switches.
- c. Interconnecting of all hood lights and control switches.
- d. Interconnecting of control switches as required on equipment shown, and all other components which come as part of any equipment shown on plan.
- e. Review all manufacturer approved installation methods/ diagrams and comply for proper installation of equipment being furnished by Kitchen Equipment Contractor.

# 2. Plumbing Contractor

- a. Make hot and cold water, waste and gas connections to all kitchen equipment shown, furnishing all necessary shut-offs, traps, backflow preventers, vacuum breakers, grease traps, drain line runs, etc., and install all faucets, pot fillers, filters and pressure regulators as furnished by Kitchen Equipment Contractor.
- b. Interconnecting of any and all other components that come as part of any other equipment shown.
- c. Provide floor drains and floor sinks where shown and indirect piping to floor drains and floor sinks as indicated on drawings.
- d. Review all manufacturer approved installation methods/ diagrams and comply for proper installation of equipment being furnished by Kitchen Equipment Contractor.

### 3. Ventilation Contractor

- a. Furnish size, shape and location of vent collars for hood and make connections to these collars. Collars by Kitchen Equipment Contractor.
- 4. General Contractor

- a. Provide and/or coordinate all work to the floors, walls, and ceiling of the space.
- b. Provide wall blocking where required and as indicated K.E.C.

### 1.7 SUBCONTRACTORS

- A. The name and addresses of all Subcontractors furnished to Architect/Owner and Food Service Consultant at time of submitting shop drawings. Selection of Subcontractors must be approved by them; and if in their judgment any fail to prosecute work in strict accordance with drawings and contract, after due notice from Owner or his agent, shall discharge same, but this in no way releases Kitchen Equipment Contractor from his obligations and responsibility under the contract.
- B. Every Subcontractor bound by terms and provisions of the contract so far as applicable to his work. Nothing contained herein shall create any contractual relations between any Subcontractor and Owner.

Note: Kitchen Equipment Contractor fully responsible to Owner for acts and omissions of his Subcontractors.

## 1.8 SHOP DRAWINGS, ETC.

- A. Immediately upon award of Contract and within 4 weeks, submit to Architect/Owner and Food Service Consultant, 3 sets of drawings for approval. Submit 1/4" scale roughing drawings showing locations of plumbing, and electrical connections with all requirements indicated at point of connection; use of a legend or numbered connection plan will be cause for drawing rejection. Prior to fabrication, Kitchen Equipment Contractor shall submit to Architect for approval 3 sets 1/2" scale shop drawings showing plan, elevations and isometric views covering all items of work. Drawings to show dimensions and details of construction, installation and relations to adjoining and related work where same requires cutting or close fitting. Show reinforcement, anchorage, etc., required for complete installation. After correction and approval of above -- submit 6 sets for record, then afterwards as many additional copies as required by client.
- B. Submit in same manner as above, drawings showing masonry bases, depressed floors, positions of walls, requirements for ceiling hangers, wall blocking, and any and all special information necessary for complete and correct correlation of various trades and satisfactory installation of all equipment shown on drawings.
- C. Manufacturer's names, cuts, descriptive data, analysis of tests, rated capacities and other information necessary for approval of standard manufactured articles and equipment furnished to Architect/Owner and Food Service Consultant for approval before ordering or purchasing. This submission made in same manner as above. All

cuts marked with item number, mechanical characteristics, accessories furnished and bound in folders.

## 1.9 GENERAL

- A. No machine or equipment acceptable from any manufacturer not having had equipment of approximately the same type and design as that specified operating successfully for at least 5 years. Machines installed for test purposes shall not come within the category of successful commercial operation.
- B. Architect/Owner and/or Food Service Consultant privileged to inspect material and fabrication at Kitchen Equipment Contractor's factory at any time.
- C. Before proceeding with shop work, Kitchen Equipment Contractor to verify all measurements at premises. Where required dimensions are not immediately obtainable and delay in waiting for these dimensions would cause work to be seriously delayed, the matter shall be referred to Architect for a decision. In obtaining measurements, Kitchen Equipment Contractor shall consider work requirements of other trades, and equipment designed and fabricated to provide necessary clearance for surrounding and adjoining work.
- D. Kitchen Equipment Contractor responsible for making any and all necessary adjustments to complete his work in a workmanlike manner, as approved by Architect/Owner.
- E. Dimensions as indicated on drawings and specifications are approximate, and are to be adjusted if and where necessary to suit job conditions and field measurements.
- F. Tops of tables, shelves, tops and exterior panels of cabinets, counters, doors, drainboards, etc., to be constructed of a single sheet of metal. Where size of equipment requires more than 1 sheet of metal, sheets butt joined with joints continuously welded full length. No joints less than 18" from an edge or end of a piece of equipment. In addition, all joints shall have battens or stiffeners welded to jointed material, ground smooth and polished.
- G. Appliances of rigid construction free from objectionable vibration and quiet in operation.
- H. Electrical heating elements shall conform to latest standards of National Electrical Manufacturer's Association and Underwriters Labs., Inc., where applicable standards have been set up by such agencies.
- Motors of ample power to operate machines for which designated under full load operating conditions without exceeding nameplate ratings. Horsepower requirements on driven equipment determined by manufacturer, based on normal operation of maximum capacity.

- J. Motors drip-proof, splash-proof or totally enclosed type, having two-hour duty cycle and ball bearings (except small timing motors which may have sleeve bearings). All motors shall have windings impregnated to resist moisture. Motors located where adjacent to deposits of dust, lint, etc., totally enclosed type.
- K. It is the responsibility of the K.E.C. to supply and mount all electrical outlets, switches, controls, etc. within table/counter back splashes, aprons, panels, etc. and to provide S.S. cover plates as required. Furthermore, it is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within table/counter interior to junction boxes, outlets, switches, controls, etc. for equipment indicated, if required.

# 1.10 STAINLESS STEEL (S.S.)

- A. Where S.S. is specified, it shall be Type 304, nickel bearing iron alloy, containing approximately 17.0% to 19% chromium, 8% to 10% nickel, not more than 0.2% carbon, and not more than 2.0% of other alloying elements; designed being austenitic (non-magnetic).
- B. S.S. free from scale with all surfaces polished to a high commercial finish. All welding and exposed welds hereinafter specified, must be ground down and polished smooth to a #4 finish so that no evidence of welding will appear. Unexposed welds on underside of counter or tables ground smooth and treated with an acid solution to remove weld discoloration and oxidization and to arrest corrosion.
- C. Undersides of all counters, work tables, sinks, drain boards, etc., after fabrication, to have one (1) heavy coat of sound deadening material applied as allowed by local codes.
- D. Gauges for sheet iron and sheet metal, U.S. Standard.
- E. Rivets, welds, bolts, screws, nuts and washers to be steel except where brass or S.S. is fastened, in which case they shall be brass or S.S., respectively. Where dissimilar metals are fastened, welds, bolts, rivets, screws, nuts and washers, highest grade metal. Spacing and extent of welds, rivets, bolts and screws such as to insure suitable fastening and prevent bulging of metals fastened.

# 1.11 SANITATION

A. All custom built equipment constructed in accordance with standard No. 2, 4 & 7 of National Sanitation Foundation Testing Laboratory, manufactured by a company approved by N.S.F. and carry their stamp of approval. Kitchen Equipment Contractor must have "Registered" numbered seal of N.S.F. approval.

## 1.12 OPERATING INSTRUCTIONS

- A. Kitchen Equipment Contractor shall leave all items of equipment in good, operating condition, and furnish the services of a "Qualified" competent manufacturer's representative to instruct Owner's employees in proper use and care of equipment. Representative on call for as long a period as is necessary to assure Owner that such instruction is thoroughly understood.
- B. Kitchen Equipment Contractor or his qualified manufacturer's representative, thereafter, shall make all necessary calls during warranty period. Kitchen Equipment Contractor must include this service in bid.

# 1.13 SAMPLES

A. Prior to Award of Contract, when requested, Kitchen Equipment Contractor shall supply Architect with samples of fabricated equipment, such as corner of table with a rolled or inverted "V" edge, corner of dish table, overshelf, drawer assembly, table leg with foot and gusset, or as specifically requested.

# 1.14 GUARANTEE

A. Kitchen Equipment Contractor shall guarantee in writing his workmanship, material and equipment for a period of 1 year from date of final payment and acceptance of installation, and shall remedy any defect due to faulty workmanship or materials which may appear within guarantee period. Manufacturer's instruction manuals on equipment, etc., turned over to the Owner in duplicate, bound in a folder and marked accordingly.

## 1.15 EQUIPMENT CONSTRUCTION AND STANDARDS

A. Where initials S.S. are used, they refer to "stainless steel;" C.P. refers to "chrome plated;" N.I.C. refers to "not in contract;" G.I. refers to "galvanized iron;" F.D. refers to "floor drain", and F.S. refers to "floor sink."

### 1.16 WASTES AND OVERFLOWS

A. Sinks to have DrainKing rotary stainless steel ball drain, Teflon seals, 2" outlet, brass housing to be chrome plated, S.S. strainer plate, Fisher tail piece with threaded connection Fisher #6129, rotary lever operated waste outlets and overflows, such as manufactured by Fisher Mfg. Co., installed by Kitchen Equipment Contractor.

## 1.17 WATER INLET LOCATION

- A. Located in all cases above the positive water level to prevent siphoning of liquid into water system. Wherever conditions require water inlet below such level, a suitable type of vacuum breaker shall be placed on fixture and form part of same to prevent such siphoning.
- B. All faucets furnished by Kitchen Equipment Contractor as specified. Traps furnished by Plumbing Contractor.

## 1.18 PITCH AND DRAINAGE

A. Wherever a fixture is used with waste or drain outlet, surface shall have distinct pitch towards outlet. Drainboards and tables that contain or adjoin sinks shall have a definite pitch towards sinks. Where necessary, surfaces creased and grooved to give a definite pitch.

## 1.19 SINKS

- A. #14 gauge S.S. interior corners rounded to 1" radius horizontally and vertically, forming a cove in bottom. All joints butt edged. Sink sizes given, inside measurements.
- B. Bottom of each compartment creased to center and fitted with a rotary drain as described in section 1.16, hereinbefore specified. Waste lever not to protrude beyond body of sink. Sinks to have overflows installed by Kitchen Equipment Contractor.
- C. Overflow to consist of 1-1/2" chrome plated brass strainer plate, fitted in back of each compartment at proper level directly connected to waste outlet with 1-1/2" chrome plated brass pipe.
- D. Back of sink extended integrally approximately 12" above working level, back 2-1/4" on 45° angle towards rear and then flanged down 1" and punched to accommodate faucets.
- E. Front and both ends, unless otherwise specified and shown, finished on top edge, 3" above working level, with 1-1/2" diameter, 180° welded integral roll. Exterior corners rounded to a 2-1/2" radius, all integrally welded.
- F. Sinks and drainboards finished on front and back edges only and left with straight edge on ends, so that drainboards may be welded thereto, forming integral units with top edge of rolled rim curbing formed on one horizontal plane across front to unit though surfaces of drainboards pitched to sinks.
- G. Multiple compartment sinks divided with double wall #14 gauge S.S. partitions, all corners rounded same as corners in sinks, continuously welded in place.

H. Back, bottom and front of one continuous piece with no overlapping joints or open spaces between compartments.

#### 1.20 SINK BOWL BUILT INTO TABLE TOP

- A. Sink constructed integral with table top #14 gauge S.S. having all interior corners coved vertically and horizontally forming a cove in bottom. To have overflow, lever waste outlet, etc..., as hereinbefore specified for sinks in spec section 1.19.
- B. All joints butt edged and welded, ground and polished, so that no evidence of welding will appear. All sink sizes inside measurements. Table top where shown, punched to receive deck type combination faucets, provided by Kitchen Equipment Contractor.

#### 1.21 FAUCET AND BASKET DRAIN ASSEMBLY

- All pot and pan sinks, unless otherwise specified, furnished with (1) Fisher Mfg. Co. Α. stainless steel #24589 pre-rinse unit 3/4", and (1) Fisher Mfg. Co. stainless steel #51209 faucet, 3/4" with 14" swing spout. Preparation sinks, unless otherwise specified, furnished with (1) Fisher Mfg. Co. stainless steel #60798 faucet, ½" with 12" swing spout. Built-in work sinks and similar type sinks, unless otherwise specified, furnished with Fisher Mfg. Co. stainless steel #57665 faucet, ½" with 12" swing spout. Hand sinks, unless otherwise specified, furnished with (1) Fisher Mfg. Co. stainless steel #58564 faucet. ½" with 6" swing spout. All faucet assemblies complete with mixing faucets, nipples, elbows, and backflow preventers for Plumbing Contractor to install and connect. All faucets specified to have standard wrist type handle, NO LEAD Stainless Steel construction, polished to mirror finish, internal stainless steel seats, two part swivel stems to prevent cross flow, ADA easy turn stems. All plumbing fixtures shall be certified CSA, ASME A112.18.1/CSA B125.1, AB1953/HSC 116875, Vermont Bill S152, NSF/ANSI 61 sec 9, annex F and G, NSF/ANSI 372 low lead content, ASTM F2324.
- B. Unless otherwise specified, all sinks shall be fitted with Fisher Mfg. Co. DrainKing waist valve #22306.

## 1.22 DRAINBOARDS

- A. #14 gauge S.S. full width of sink carried up approximately 12" at back and where adjacent to wall and finished same as heretofore described for back of sink, and having 3" high curbing at front and ends not adjacent to walls and finished with integral 1-1/2" diameter 180° roll, unless otherwise specified.
- B. Drainboards continuously welded to sinks.

C. Drainboards 30" long or less shall have 1-1/2" #16 gauge S.S. tubular braces secured at underside near front and welded to S.S. gusset at leg anchor. All others to have legs and cross bracing with full length and width undershelf as specified for tables.

### 1.23 TABLES WITH S.S. TOPS

- A. Tops of #14 gauge S.S. 1 piece construction with all edges turned down into 2" integral 180° roll with all corners rounded to 2" radius forming a bullnosed corner. Corner welded and polished smooth.
- B. Table tops thoroughly cross braced with 4" x 1" S.S. channel stiffeners #14 gauge welded to underside. All cross braces spaced not over 24" on center.
- C. Table tops adjoining walls or adjacent equipment carried up approximately 6" and returned 1", down 1" at top and ends. Intersections of table top and raised edge coved to 1" radius. Where backsplash is exposed, it shall have finished S.S. back.
- D. It is the responsibility of the K.E.C. to supply and mount all electrical outlets, switches, controls, etc. within table/counter back splashes, aprons, panels, etc. and to provide S.S. cover plates as required. Furthermore, it is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within table/counter interior to junction boxes, outlets, switches, controls, etc. for equipment indicated, if required.

# 1.24 LEGS AND CROSSRAILS

- A. 1-5/8" O.D. #14 gauge S.S. tubular-type with S.S. bullet shaped feet having minimum vertical adjustment of 1-1/2" without showing threading or adjusting bolts. Feet fully enclosed on bottom. Adjustment of feet by means of a threaded shank attached to foot and screwed into a properly secured threaded member inside of leg. Construction of leg such that it shall fit over shank of foot so no liquid or other material can work their way into legs or foot.
- B. Tops of legs attached to enclosed conical gussets of heavy gauge S.S. Gussets welded to #14 gauge S.S. 4" x 1" channels to underside on which they appear. Crossrails 1-1/2" O.D. #14 gauge S.S. coped and welded to legs approximately 10" A.F.F. or as specified.

#### 1.25 OVERSHELF - TABLE TYPE

A. #16 gauge polished S.S. with all edges turned down and finished in a 1-1/2" diameter 180° roll - corners bullnosed, welded 1 piece construction.

B. Shelves supported by 1" O.D. #14 gauge S.S. tubular uprights, tapered at top and flared at bottom, secured to table top with concealed inner tie rods, bolts and nuts. Uprights spaced approximately 42" on center not to interfere with table top proper. When uprights are located in other areas in addition to each end of table then they shall be cantilevered.

## 1.26 OVERSHELF - WALL TYPE

- A. #16 gauge polished S.S. with back edge turned up 2", remaining ends turned down in 1-1/2" diameter 180° roll with corners bullnosed welded, ground and polished.
- B. Shelves supported by #12 gauge S.S. cantilever brackets. Shelf spaced 1" from walls when in place and secured to same with C.P. toggle bolts. Undersides secured to brackets with concealed welded studs, nuts and washers. Brackets spaced approximately 42" on center.

#### 1.27 UNDERSHELVES

- A. #16 gauge polished S.S. full length and width of table with all edges turned down into 2" wide channel. In way of table legs, shelf notched to fit contour of legs and fitted to same in neat, workmanlike manner to eliminate unsanitary crevices, fully welded, ground and polished.
- B. Undershelves reinforced on underside with welded 4" x 1" longitudinal channels of #14 gauge S.S. where applicable. All signs of welding on shelf surface removed.

### 1.28 DRAWERS

- A. Of #18 gauge S.S. all interior corners coved to a 1" radius both vertically and horizontally. All welds ground and polished to a uniform finish.
- B. Front of #14 gauge polished S.S. and will extend on both sides of drawer body to conceal slides, corners welded, ground and polished. Space between drawer front and body fully enclosed at bottom, back and both sides by means of a #20 gauge S.S. filler, spot welded to drawer front and body, to provide a fully sealed, vermin-proof enclosure. Drawer front provided with a 5" C.H.G. # P46-1010 S.S. pull handle fastened in place by means of a concealed screws.
- C. Drawer slides of #14 gauge S.S. fitted with 4 case hardened ball bearing rollers. Track attached to drawer is to have upper edge channel shaped to fit contour of roller rim to provide a positive drawer guide and prevent jarring. This drawer track firmly spotwelded to body. Outer track provided with auto stops to lock without the use of tools.

- D. Where specified, drawer provided with removable synthetic carving board. Carving board is to slide into enclosure under drawer made of #14 gauge S.S. and extending across underside of carving board, with both sides turned up and welded to slide assembly. The 2 sides provided with #14 gauge S.S. angles with stops at rear fastened in place 1/8" above top surface of carving board to provide guide and storage compartment when carving board is not in use. Carving board is to measure approximately 21" x 21" x 1" thick.
- E. Tool drawer 20" x 20" x 5" deep, bread drawer 20" x 20" x 10" deep. All drawers to have 4 pin paracentric keyed-alike built-in locks same as sliding and hinged doors. C.P. where exposed.

#### 1.29 POT AND PAN RACKS AND CEILING HANGERS

- A. Unit 24" wide, of length as shown, of 2" x 1/4" S.S. bar throughout. Outer rail to have fully rounded ends of 1 piece all welded construction. Center rail located 12" below outer rail and fastened to same with V-shaped braces of 2" x 1/4" S.S. bar. All joints continuous welds. V-shaped braces spaced not over 60" on center. Racks fitted with removable sliding type S.S. pot hooks spaced 9" on center.
- B. Unit hung from iron structure, ceiling or slab by 1" O.D. #14 gauge S.S. tubing. It shall be flattened, rounded with ends fully welded and fastened to rack by 3/8" round head screws with cap nuts and lock-washers. Top of tubular ceiling hanger welded to #12 gauge S.S. disc approximately 4" diameter that in turn anchors to joists above. Ceiling hangers over 60" in length to have diagonal sway braces of 1" O.D. S.S.
- C. Proper anchorages, etc., installed in iron structure, ceiling joists or slab by Kitchen Equipment Contractor prior to final finish of ceiling. Top rail of unit 90" A.F.F.

#### 1.30 EXHAUST HOOD

- A. Dimensions approximately as shown on contract drawings and mounted at 80" A.F.F. to underside of hood. Final dimensions to be determined in field by Kitchen Equipment Contractor. Proper anchorages, etc..., installed in ceiling joists, slab, etc..., by Kitchen Equipment Contractor prior to final finish of ceiling.
- B. Body of #18 gauge S.S. front, back and sides straight as shown. All joints flush welded. Where field joints occur, provide a pair of transverse frames, butted together and securely bolted following contour of hood structure. Framing 1-1/2" x 1-1/2" x 1/8" G.I. angle with all joints welded.
- C. Bottom rim of hood attached to channel of #14 gauge S.S. with mitered welded corners and butted field joints. Cross section inside of channel to measure approximately 2-1/2" horizontally, flanged upward tightly against interior lining of hood.

- D. Above dishwashing machine, kettles and steamers, etc., hood provided with sloped baffle at back arranged at 45° angle of #18 gauge S.S. Baffles to have sliding dampers of #16 gauge S.S. mounted in #14 gauge S.S. channel tracks. Each damper to have S.S. handle fastened with concealed bolts. Exhaust Hood to be in conformance with IMC 2009 section 507.
- E. Section over ranges, etc., shall have built-in filters at back extending full length and arranged at an angle of 45° easily removable without use of tools. Filters to be 20" x 20" x 2" thick, of S.S. and expanded metal construction or as further indicated on drawings. Filters set into #14 gauge S.S. filter frame, bottom of which is integrally installed with back of hood and grease gutter for easy cleaning. Quantity and size of openings in plenum chamber cut and determined in field and fitted with collars by Kitchen Equipment Contractor.
- F. Hood provided with S.S. hangers spaced not more than 36" on center.
- G. Section of hood below ceiling or soffit, enclosed with vertical facing of #18 gauge S.S. Panels not over 3' in width, removable where required, provided with recessed finger grip. Where panels meet at vertical joints flanged inward 1" to form a hairline joint. Channel extended 2" beyond perimeter of hood and provided with concealed full length angle member of 2" x 2" x 3/16" G.I. with clips for bolting to hanger angles, spaced approximately 3' on center Hanger angles attached to 2" x 2" x 3/16" angle frame fastened to ceiling slab. Panels held in place at ceiling with 2" x 2" x 1/8" S.S. angle trim all around.
- H. Front (working side) provided with vapor-proof L.E.D. lights approximately 48" in length. Actual wiring, however to current, by Electrical Contractor. Light fixture, with bulb(s), as provided by specified exhaust hood manufacturer, refer to Part 2 Products.
- I. All exhaust hood controls, switches, etc... to be mounted @ 48" AFF. This is to be the maximum height allowed.
- J. Must be tested and must comply with the following codes UL-710, IMC2009 section 507, and NFPA 96 2008.

# 1.31 NOT APPLICABLE

## 1.32 FIRE PROTECTION SYSTEM

A. The system shall be a pre-engineered cartridge-operated type R-102 system utilizing Liquid Ansulex agent, with a Fixed Nozzle distribution network. It shall be furnished and installed in compliance with UL Standard 1254, UL Standard 300, NFPA 96-2008 and any prevailing statutes or codes including automatic shut-down of all cooking appliances per code section 44 of NFPA 17A-27-2002.

- B. System to provide connection to building Fire Alarm System per NFPA 17A; Section 3-2.1.5.
- C. Fire protection remote pull stations mounted @ 48" AFF, located 10 ft. minimum to 20 ft. maximum from exhaust hood(s).
- D. The extinguishing agent shall be a specifically formulated aqueous solution of organic salts contained in a S.S. tank with 3 gallons minimum capacity, and able to withstand test pressure of 330 PSI. A welded S.S. bracket shall be provided for mounting the tank.
- E. The regulator releases mechanism shall be capable of providing sufficient expellant gas to discharge enough agent to meet the minimum nozzle discharge requirements. The mechanism shall have a visual indicator of "fired" condition. This mechanism shall be capable of being operated by fusible link detection, remote manual release and local manual release. The mechanism should be housed in a S.S. enclosure with cover containing identifications thereon.
- F. Each discharge nozzle to be listed with UL approval for placement and size. Each nozzle shall have a rubber blow-off cap to keep the nozzle tip orifice free of cooking grease build-up. All exposed piping to be chrome plated finish, and there shall be no exposed threads.
- G. Kitchen Equipment Contractor to furnish mechanical (electrical) gas valve, up to 3" in size and coordinate the install/provisions to shut-off all fuel supplies to all cooking appliances beneath Type I exhaust hood upon activation of system. If electrical gas valve is to be utilized, Kitchen Equipment Contractor to furnish reset relay push button.

It is the responsibility of the Plumbing Contractor to install, coordinate and make any provisions necessary for complete operation of gas valve.

It is the responsibility of the Electrical Contractor to furnish and install electrical wiring, relays, etc... and make any provisions necessary for complete operation of gas valve. In addition, Electrical Contractor to furnish and install automatic equipment necessary to shut-off all electric beneath Type I exhaust hood upon activation of system.

- H. Kitchen Equipment Contractor to furnish and install a Class K Fire Extinguisher, dedicated to each room where a Type I exhaust hood is installed.
- I. Upon completion of installation, the installer to perform a wet chemical test or at the time of the test, the authority having jurisdiction may allow the Contractor to use flushing concentrate and water solution. However, whichever is permitted, it must be in compliance with Code. This test shall activate the entire system, except the agent supply tank, which will be substituted by the test tank of like pressure and size. Following a satisfactory test, the original tank shall be replaced. The system shall then be certified to be in working order and all authorities shall be so advised in writing. Provide Owner with copies of all satisfaction/acceptance tests.

- J. The system to be furnished and installed by a factory distributor in accordance with the manufacturer's instructions. This shall include mounting of the system units, manual releases, nozzles, actuating devices, and the running of all pipe and control tubing applicable to the R-102 system. If and when requested, submittal drawings concerning the fire system shall have affixed the seal and signature of a licensed engineer for the State in which they are to be installed. A 1-year service contract and maintenance program to be provided.
- K. Kitchen Equipment Contractor is required to submit a copy of the hood suppression system shop drawing to the Bureau of Facilities Planning for approval, as well as submission to the Architect. In addition, shop drawings when submitted, must be signed and sealed by an engineer licensed to practice in the State where the system is to be installed.

## 1.33 DISH TABLES - SOILED AND CLEAN

A. #14 gauge polished S.S. with exposed edges finished in 3" high curbing with a 1-1/2" diameter, 180° rolled trim at top, corners bullnosed, welded. Where adjacent to wall, top carried up 12" integrally at top and ends. All joints in top welded and free of buckles and weld marks. When applicable, where top (also raised back), adjoins dishwashing machine, same flanged down 1" into machine and secured water tight, backsplash in this area brought forward diagonally to machine to form a baffle. Tops thoroughly cross braced with 4" x 1" channel stiffeners of #14 gauge S.S. and welded to underside. Cross bracing approximately 24" on center, running front to back. All corners in top rounded to 1" radius, vertically and horizontally.

#### 1.34 NOT APPLICABLE

#### 1.35 NOT APPLICABLE

#### 1.36 PRE-WASH SINK

- A. Approximately 21" x 21" x 7" deep, of #14 gauge S.S. integrally welded to table top, forming an integral unit with same. Sink bowl identical to that specified for sink built into table top including basket drain assembly with built-in overflow, etc. Sink pitched to a 2" IPS C.P. brass "lever" waste outlet and fitted with a #18 gauge S.S. snug fitting basket approximately 19" x 19" x 6" deep, with continuous perforation and reinforced top edges and 4 sides. Basket of all welded construction mounted on 2" high S.S. feet.
- B. Top of pre-wash sink fitted with S.S. guide for dish racks. Guide of 1-1/2" x 1-1/2" x #12 gauge S.S. angles with ends flared out to facilitate easy movement of racks. Guide welded to cross angles of same material, thus forming a removable frame. Dish table backsplash (unless otherwise specified and shown) in area where pre-wash sink

is located, provided with Fisher Mfg. Co. stainless steel pre-rinse unit model #33308 includes wall bracket, shortened riser pipe to 16", add on faucet with 12" swing spout, nipples, elbows, backflow preventer mounted on pre rinse unit, mixing faucet with S.S. seats and check valve stems to prevent cross flow, EPAct 2005 certified.

#### 1.37 NOT APPLICABLE

#### 1.38 WALL CABINET

- A. Wall cabinet is to be of length hereinafter specified, 15" front to back and 30" high at front with dust proof top sloped up 6" on 45° angle toward rear. Exterior bottom to be of flush type construction.
- B. Cabinet constructed of #18 gauge polished S.S. with all joints and crevices on cabinet front and sides, welded, ground and polished smooth to a uniform finish. Channel shaped cabinet front is to be fully enclosed inside of cabinet to eliminate openings between shelf and cabinet front. Interior to be provided with fixed in place bottom shelf and 2 removable adjustable intermediate shelves of #16 gauge S.S. shelves will have 1" wide channel edges on all sides with corners welded ground and polished and provided with clips to engage S.S. keyhold strips secured to interior of cabinet.
- C. Cabinet doors previously described in specifications. Door is to be fastened to cabinet by means of fully concealed heavy duty hinges. Each door must be fitted with keyedalike type locking device.

# 1.39 SERVING COUNTER

- A. Of size and shape as shown. Top of #14 gauge polished S.S. rolled down in a 2" diameter 180° roll on all exposed edges with corners bullnosed, welded. Top secured to counter base by means of concealed S.S. studs, nuts and washers. Angle frame under top sheathed with sound deadening material.
- B. Base constructed with interior framing of 1-1/2" x 1 1/2" x 1/8" galvanized steel angle with all joints welded.
- C. Angle framework concealed on the interior with #18 gauge polished S.S. sheathing. Exterior facing of base cabinet and ends to have sheathing of Plastic Laminate paneling laminated to 3/4" thick solid core, exterior grade marine plywood, panel length not to exceed 36". Color and style of paneling selected by Architect. Each panel of length as indicated, full height of counter and splined hairline joints. Panels and trim secured to interior framing by means of concealed welded studs, nuts and washers. Or constructed of alternate materials as detailed on drawings.

- D. Interior of all available space provided with bottom and intermediate shelf of #16 gauge S.S. turned up approximately 2" at rear and ends, and down 1-1/2", and in 1/2" channel shape at front.
- E. Mounted on masonry base, height as indicated on drawings or 6" high 14 gauge S.S. legs with S.S. removable toe base, where indicated. All openings in top flanged downward approximately 1" around their entire perimeter. Top cut out for and provided with equipment as hereafter specified.
- F. It is the responsibility of the K.E.C. to supply and mount all electrical outlets, switches, controls, etc. within table/counter back splashes, aprons, panels, etc. and to provide S.S. cover plates as required. Furthermore, it is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within serving counter interior to junction boxes, outlets, switches, controls, etc. for equipment indicated, if required.

### 1.40 SOLID SURFACE SERVING COUNTER

- A. Of size and shape as shown. Top of minimum 1/2" thick solid surface, silicone mounted to minimum 1/2" thick exterior grade plywood with ten year installation warranty. Solid Surface type, fabricated to comply with Solid Surface commercial specifications. Color and style of solid surface as selected by Architect. Top secured to counter base by means of concealed S.S. studs, nuts and washers. Angle frame under top sheathed with sound deadening material.
- B. Constructed identical to that as hereinbefore described in section 1.39.

#### 1.41 HOT FOOD SECTION

- A. Top #14 gauge polished S.S. integral and continuous with counter and top, provided with 12" x 20" openings as shown.
- B. Each opening to have #14 gauge S.S. well measuring approximately 6-1/2" deep. Where top is flanged down into well, fitted with a breaker strip on 4 sides of opening. When and where food wells are used with drains, all drains are to be interpiped with 1-1/2" C.P. or S.S. piping by Kitchen Equipment Contractor, and extended to common point near floor drain for Plumbing Contractor to make indirect waste connections. Kitchen Equipment Contractor to furnish and install C.P. or S.S. shut-off valve extending for easy access.
- C. Each well heated as hereinafter specified, dry-moist type electric heater with individual thermostatic control and pilot light. Thermostat dials and pilot lights attached on attendant's side recessed into a panel installed inside of plate shelf areas or apron mounted as shown. All electric food wells connected to a common heavy toggle switch. Wiring concealed.

- D. Food wells to have bottom of housing fitted with sectional removable #16 gauge G.I. bottoms for access to wiring and elements. Counter base under hot food section to be lined with #18 gauge S.S.
- E. Each hot food section provided with the following #20 gauge Polar Ware Classic Anti-Jam inserts and covers: two S12104 pans with two 1/2 size lift-off covers and provide one dome-type 12" x 20" lift-off cover for each opening; two S12106 pans, three S12066 pans, four S20124 pans; four S12102 pans, four S20122 pans.

#### 1.42 COLD PAN

- A. Of size and shape shown, approximately 20" wide, of length as shown on plan, 6" deep in the clear, unless otherwise indicated, constructed in accordance with NSF #7, integrally constructed into counter and top. To have sectional #18 gauge S.S. perforated false bottom in sections not over 18" wide, 1/2" channel edge on 4 sides. Interior lining to have all corners rounded to 1" radius vertically and horizontally, of #14 gauge S.S. all joints and crevices welded. Where cold pan is used as a salad bar, same to be 8" deep in the clear unless otherwise indicated.
- B. Insulation in all 4 sides and bottom of unit 2" thick polyurethane or equal. Refrigeration coils copper 1/2" O.D. and 3" on center, sweated to underside and embedded in insulation. Provide a copper tubular refrigeration coil, further sealed with hydrolene. Coils connected to compressor hereinafter specified, and shall have liquid line with solenoid valve and thermostat for control, provide a shut-off valve in liquid line ready and accessible to disengage same when required.
- C. Exterior sheathing of #18 gauge S.S. bottom pitched and fitted with a 1-1/2" drain outlet with threaded connection plumbing. Plumbing Contractor to extend drain line so as to flow into adjacent floor drain. Joint between top of cold pan and turned down edge of counter top provided with breaker strip around full perimeter of opening.
- D. Where shown, space under counter provided for installation of compressor. This section fitted with removable #18 gauge S.S. grill on attendant's side. Shall have not less than 75% rectangular perforation. Counter front panel and/or sides where possible in way of compressor housing louvered. Interior of housing reinforced with horizontal and vertical framework of 1 1/2" x 1-1/2" x 1/8" angle having all joints welded. Lower frame provided with #14 gauge channel stiffeners welded in place and fitted with rubber cushions. Channel spaced to properly support condensing unit. Housing approximately 24" left to right to properly admit compressors.
- E. Refrigeration coils connected to condensing unit, size as indicated on plan, air cooled, furnished complete with all necessary copper tubing, thermostatic control valves dehydrators, expansion valves, sight glass, etc., to make a complete working unit with warranty and free service, guarantee for 1 year. Compressor connected to coils of cold pan in a satisfactory and operating manner. Compressor, etc., internally wired.

Provide push button switch with pilot lite recessed in adjacent section in apron above housing to turn on/off cold pan as required.

#### 1.43 NOT APPLICABLE

#### 1.44 TRAY SLIDE

- A. Of size and shape, as hereinafter specified and/or shown on contract drawings. Installed where shown, 12" wide, #14 gauge S.S. construction or in strict accordance to that as detailed on drawings.
- B. In general, unit mounted on #12 gauge S.S. ornamental type brackets secured to front trim of counter in a concealed manner with welded concealed studs. Back edge of turned up section made to fit tight with turned down front section of counter top and definitely free of voids, cracks and unsanitary joints.

#### 1.45 SOLID SURFACE TRAY SLIDE

- A. Of size and shape, as hereinafter specified and/or shown on contract drawings. Installed where shown, 12" wide with bull nose edge detail, silicone mounted to minimum 1/2" thick exterior grade plywood with ten year installation warranty. Solid surface type, fabricated to comply with commercial specifications. Color and style of solid surface as selected by Architect. Constructed in strict accordance to that as detailed on drawings.
- B. In general, unit mounted on #12 gauge S.S. ornamental type brackets secured to front trim of counter in a concealed manner with welded concealed studs. Back edge of turned up section made to fit tight with turned down front section of counter top and definitely free of voids, cracks and unsanitary joints.

### 1.46 NOT APPLICABLE

# 1.47 COUNTER AND CABINETS WITH SEMI-ENCLOSED BASE

- A. Top of #14 gauge polished S.S. finished 1/2" above working level with 2" diameter 180° roll, bullnosed corners on all exposed sides. Where adjacent to wall, top carried up approximately 6" (or as specified hereinafter and shown) and returned 1" at top and ends towards wall with corners welded forming a continuous unit. Top fastened to cabinet by means of welded and concealed studs.
- B. Cabinet below top to have #18 gauge S.S. enclosure. Front stiles of cabinet channel shaped. This channel fully enclosed inside of cabinet. Top reinforced by means of

horizontal framework of S.S. 1-1/2" x 1-1/2" x 1/8" angle with cross braces not more than 18" on center Framework of all welded construction and intermediate shelves in cabinet of #16 gauge S.S. turned up on all sides to eliminate crevices at shelf surface. Front edge of shelf channel shaped. Shelf surface reinforced by means of #16 gauge S.S. channel stiffeners spaced on not more than 24" on center. Mounted on 6" S.S. adjustable legs, or as hereinbefore shown and specified.

## 1.48 NOT APPLICABLE

#### 1.49 DOORS

- A. Whether sliding or hinged type, not less than 1/2" thick overall, double paneled having 3/8" sound-deadening material between #16 gauge S.S. front and #18 gauge S.S. back, reinforced between panels by wide channels, running height of door and made of same material. Panels jointed with continuous welding. Doors and vent openings to have back panel boxed around vent opening and welded to front panel. Doors dust proof and entire front face without seams or joints.
- B. Sliding doors mounted on ball bearing type rollers, sliding in dust proof #14 gauge S.S. tracks overhead, fastened so as to eliminate vibration and jarring when doors are rolled. Doors fitted with limit stops. Bottom guide of #14 gauge S.S. for doors, open and flat, lining up with lower shelf of cabinet slots so arranged that crumbs or dirt accumulating in the cabinet will drop to the floor when cabinet is cleaned. Recessed handles solid material, not stamped, of S.S. welded to front panel. Finger grips of ample depth to comfortably pull the door. Doors provided with keyed-alike S.S. faced cylinder locks, built-in flush.
- C. Hinged type doors flush fitting, unless otherwise specified, resting tightly against rabbetted frame. Hinged doors provided with Klein Model #Y-48 (or approved equal) keyed-alike S.S. faced cylinder locks with Model #12230-SM (or approved equal) handles. In case of pair of doors, each individually controlled as outlined and is to close against rubber bumpers.
- D. Outer edges smooth, free from burrs, projections and fins. Excess welded metal removed by precision grinding and polishing.

## 1.50 REFRIGERATORS AND REFRIGERATION UNITS

A. Reach-in refrigerators, freezers, and refrigerated units, as shown unless otherwise specified, furnished by Kitchen Equipment Contractor. They shall meet all requirements as set forth for individual item number and complete with self-contained or remote compressors and motors. Cooling coils blower type, unless otherwise called for, provided with initial charge of approved CFC free refrigerant. Plumbing Contractor responsible for extending refrigerator drain line, where required, to spill into adjacent

- floor drain in approved manner. Extended drain line not less than 3/4" I.D. and C.P. or S.S. tubing.
- B. All refrigerated equipment, refrigerators and freezers, whether walk-in or reach-in, started and adjusted to maintain required temperatures, charged with approved refrigerant as required.
- C. All reach-in refrigerators, freezers, hot food warmers, etc., to have keyed-alike locks. Kitchen Equipment Contractor must request this at time of placing order to avoid correction at a later date at Kitchen Equipment Contractor's expense.
- D. Kitchen Equipment Contractor to provide 1 year's free service for all types of refrigerators and refrigeration equipment. Free service on all compressors, unit coolers, controls, etc., to include adjustments and repairs, irrespective of cause, whether mechanical, operational or manufacturing at no additional cost to Owner. Five (5) year warranty provided on all compressors.

#### 1.51 WALK-IN REFRIGERATOR AND FREEZER

- A. General Description: To be N.S.F. approved units, of size and manufacturer as indicated on contract drawings, 8'-6" high, unless otherwise specified, completely furnished and assembled unit installed in an approved manner. As indicated on drawing, either installed into a 6-1/2" depressed floor area with flush type door sill and floor finish as shown on contract drawings, or installed directly on floor with interior ramp, and pre-fabricated aluminum floor with heavy duty structural underlayment floor, approximately 5,000 pounds per square feet of load. Where pre-fabricated floor with interior ramp indicated, unit to be finished with "First Choice" vinyl safety flooring provided and installed by Kitchen Equipment Contractor. Where depressed floor indicated, doors, floors, etc. to accommodate concrete-tile finished floors, provided and installed by G.C. after all boxes have been set in place. Walk-in freezers to maintain 0° to "minus" 10° Fahrenheit temperature. Walk-In refrigerators to maintain 35° to 36° Fahrenheit temperature.
- B. Finishes: Unexposed exterior of each unit to be .040 stucco aluminum finishes. All exposed exterior surfaces to be #20 gauge stucco S.S. finish. Interior, except floor, to be .040 stucco white aluminum finish. Floor as noted hereinbefore in spec section 1.51 A.

### C. Insulation:

 Insulation shall be 4" thick rigid urethane foam, foamed-in-place to bond to inner surfaces of metal pans. Urethane foam to have a thermal conductivity (K factor) of not more than 0.118 BTU/hr./sq. ft. per degrees Fahrenheit/inch, and an overall coefficient of heat transfer (U factor) of not more than .029. The "R" factor shall be 34.

- 2. (Optional) Prefabricated urethane foam panels shall be supplied with a Class 1 fire hazard classification according to ASTM-E-84 as tested by Factory Mutual System. Panels shall have a flame spread rating of 25 or less and a smoke density of no greater than 450°. Every panel shall bear a certifying Factory Mutual label.
- 3. \* These ratings are not intended to reflect hazards presented by this or any other material under actual fire conditions.
- D. Doors: Each walk-in shall be equipped with one standard 34"/36" x 78" hinged-type, flush mounted entrance door bearing the UL seal of approval, or of size as indicated on drawing. Each door section consists of a heavy reinforced steel "U" channel frame, foamed-in-place to give extra support and rigidity to the frame and to prevent racking, distortion, warping and twisting. Doors to be #20 gauge S.S. interior and exterior. Door and door panel sections to have 1/8" diamond tread kick plates, 36" high on interior and exterior. Walk-in entrance doors shall be equipped with a one-piece perimeter NSF approved PVC accordion type removable gasket. A magnetic core at top and side shall provide positive seal. An adjustable wiper gasket shall be mounted along the bottom edge of door. Door frames shall be provided with an LED light fixture, pilot light and switch assembly, and concealed wiring. Provide #12 gauge reinforced S.S. threshold and heater wire around the full perimeter (freezer door only). All doors hinged as shown, each with heated 14" x 24" "vision" panel.
- E. Standard Hardware: Shall be break-a-way type with cylinder lock and inside safety release handle so door can be opened from the inside even if locked. All latches designed for locking with keyed-alike locks. A positive action hydraulic door closer shall be included to insure gentle closing action of door and insure a positive seal. Hinges shall be cam-lift, self-closing, spring assist with door lift-off capability. Hinges shall be high-pressure zinc die cast with highly polished chrome finish, three per door.
- F. Filler Panels: The "exposed" open area of unit at left, right and top at front and sides neatly trimmed with #20 gauge stucco S.S. filler panels to close space between wall and ceiling. Filler panels between top of walk-in box and finished ceiling not to exceed 12" in height. Filler panels equal to exterior of unit. Top panels to be equipped with louvered sections not less than 40% of total square footage of panel (when compressor units are top-mounted).
- G. Wall Protection: Two rows of #16 gauge S.S. hat shaped rub rails with concealed fasteners; to be provided and installed at all exposed exterior walls. Top of rub rail to align with top of diamond tread kick plate on door and bottom rub rail to be 10" A.F.F. When corners are exposed, provide 6" x 6" x 60" #12 gauge S.S. corner guard.
- H. Lights: Walk-In boxes to be provided with 48" LED light fixtures, Kason model #1810, quantity as shown on plan. The walk-in refrigerator and freezer to have LED type vapor-proof light, Kason model #1806, with concealed wiring, etc., and toggle switch with pilot light mounted on exterior. Kitchen Equipment Contractor to provide bulbs. It is the responsibility of the Kitchen Equipment Contractor to install light fixtures, provide

- penetrations in ceiling panels, and seal the penetrations after Electrical Contractor has completed wiring.
- I. Sealants: Kitchen Equipment Contractor shall seal all lines, conduits, tubing, wiring, etc., passing through walls and ceiling of walk-in units with high grade caulking compound, then install S.S. escutcheons where required.
- J. Alarm System: Each compartment shall be protected by a recessed # 75B Modularm system with battery back-up, which shall provide digital readout of ambient compartment temperature(s). The alarm shall be located in an area as indicated on the Food Service Equipment Drawings. The alarm shall require 120/60/1 electrical connections through suitable 1/2" conduit. Dry contacts for activation of remote notification equipment will be provided as part of the alarm for use when specified. Furnish and install identification labels for operating temperatures as required. The Modularm 75B shall be provided with the automatic telephone dialer option, dialer located where shown on drawings. The dialer shall require 120/6/1 electrical connection, phone jack and connection to the alarm modular.
- K. Ceiling Support: When split ceilings are required due to ceiling panel span, these ceilings are to be supported by a self-support ceiling structure. The walk-in manufacturer is to provide the ceiling hanger brackets, the steel channels and the bearing steel channels. A detail must be provided on the manufacturer's submittal drawing. Note: When longer spans are required that exceed self-support capability then suspended ceilings are to be provided with manufacturer's detail.
- L. Flat Membrane Weather-Proof Roof: Shall be supplied for field installation on top of each walk-in that is located outdoors. Membranes to be fabricated from low-shrink polyester fabric coated with a permanent thermoplastic alloy and have a minimum thickness of 35 mil. Membrane shall be fire retardant, resistant to ultra-violet rays and micro-organisms. Membrane to be white in color to reflect maximum heat load from the sun. Fasteners and trim shall be provided to secure the membrane to the ceiling panels and in cases where walk-in is installed against a building; the membrane roof material will be flashed up the building walls by the equipment installation contractor. The manufacturer's detail must be provided on the submittal drawing.
- M. Compressors and Evaporators: Cooler unit, model as indicated on drawings; room air drawn through coil and discharged parallel to ceiling. The coil casing is to be aluminum with a removable drain pan. Drain line from evaporator coil to floor drain as indicated on contract drawings, attached to interior of box with clamps and installed in good, approved, workmanlike manner by Plumbing Contractor. Compressor of the hermetic and/or scroll type, with suction gas cooled motor, designed for operation with approved refrigerant. Unit complete with liquid line drier, shut-off valves, vibration isolators, heat exchanger, dual pressure control and water regulating valve (for water-cooled systems), electrical panel with circuit breaker and magnetic starter. All components and accessories in control box that pertains to the compressor unit only should be factory wired and piped.

For outdoor systems a weather-proof housing, thermostatically controlled crank case heater and low ambient controls for -20F conditions shall be provided.

Note: Electrical Contractor to provide and install fused disconnect switch where required, as well as conduit and wiring from same to terminals in compressor unit control panel. Also, interconnect conduit and wiring from compressor unit control panel to unit cooler junction box inside walk-in units.

Freezer Unit, model as indicated on drawing, to be electric defrost. The coil casing is to be aluminum with a removable drain pan. Electric heating elements and drain pan heaters. Unit shall include control kit for time initiated temperature terminated defrost plus automatic fan delay. Heat interchanger included. Drain line from evaporator coil to floor drain as indicated on contract drawings, attached to interior of box with clamps and painted to match interior finish; and installed in good, approved, workmanlike manner by Plumbing Contractor. Kitchen Equipment Contractor to install adequate amount of wrap-around, electric heater tape to assure defrosting of drain line, cable lapped not over 1" spacing. Provide Raychem Winter Guard Plus electrical heat tracing model H611050 (type 3), self regulating in temperature, run in parallel, to be designed with a maximum temperature that cannot be surpassed, certified by the manufacturer's representative that the heat trace has been installed and tested in accordance to the manufacturer's specifications. Heater tape connected to electric by Electrical Contractor. After installation and before and after installing the thermal insulation, subject heat to testing using a 2500 VDC megger. Minimum insulation resistance should be 20 megohms regardless of length. The installer shall test for both heating cable bus wires to verify the connection of any splices or tees.

Equipment shall have BTU/hr capacity as indicated on drawing and maintain room temperature of 35° to 36° Fahrenheit, where refrigerator is specified, and 0° to "minus" 10° Fahrenheit, where freezer is specified.

Refrigerant piping to be hard seamless copper tubing, by KEC. Refrigerant lines installed and covered with not less than 1" thick flexible foam plastic insulation applied in accordance with the manufacturer's recommendations. Refrigeration lines to run from compressor location where shown, above the walk-in units. All lines to be tested free from leaks prior to finish of insulated lines. Condensates drain lines outside of walk-in boxes, similarly insulated with 1/2" insulation, by KEC. Each system shall have suction line filters and vibration eliminators field installed.

Thermostatic expansion valves properly sized to handle evaporator loads. Liquid lines shall have moisture indicating sight glass, drier, and shut-off valve field installed.

The temperature in each walk-in box controlled by means of a thermostat wired to actuate a solenoid valve in the liquid lines with the compressor operation controlled by the low pressure cut-out switch. Thermostats and low pressure controls adjusted to maintain room temperatures specified. Each system cleaned and dehydrated by maintaining a vacuum of 500 microns or lower for a minimum period of 5 hours. The vacuum pump used capable of developing a vacuum of 50 microns with its valve in a

closed position. The required operating charge of refrigerant and oil shall then be added and each system tested for performance. All refrigerant lines sized for 1 lb. maximum pressure drop.

It is the purpose of the specification to provide a satisfactory refrigeration cycle, therefore, Kitchen Equipment Contractor must include the competent labor and qualified material to provide the owner with an efficient system.

N. Mounting Methods: Compressors, when mounted on building roof, to be provided with adequate dunnage/ curbing by Kitchen Equipment Contractor. Dunnage/ curbing installed by G.C. or roofing contractor. Architect to specify dunnage/ curbing details.

Compressors, when mounted on ceiling of walk-in, to be provided with adequate air circulation, service, access, and vibration isolation.

## 1.52 MILLWORK EQUIPMENT

A. General Description: Woodwork to be minimum 3/4" marine grade plywood throughout. Woodwork counters shall be constructed to support the full weight of operating appliances without any deflection of the counter top. Where cut-outs are required in counter tops, appropriate framing needs to be provided around the cut-out to fully support the top in level position.

All miter joints shall be tight with no gaps or open spaces. Filling of miter joints with crack filler prior to finishing is not acceptable. Loose joints shall be hairline, flat, in single plane, with no exposed screws, nails or other fasteners. All dimensions, reveals and joints shall be held exact.

All fixtures shall be assembled in single and complete units as the dimensions will permit shipment to and installation at the building. Large pieces requiring sections construction shall have their parts accurately fitted and aligned with each other, and provided with ample screws, glue and bolt blocks, tongues, grooves and splines, dowels, mortises and tenons, screws, bolts or suitable means of concealed fastening, as required to render the work of substantial, rigid and permanently secured in proper position.

Sufficient additional material shall be allowed to permit accurate scribing to walls, floors and related work, and due allowance made wherever possible for such shrinkage as may develop after installation. Single and sectional units shall be provided with adequate cleating, blocking, crating and other forms of protection as required to prevent damage, soiling and deterioration during transit, delivery, storage and handling.

Framing and blocking members shall be assembled with bolted and screwed connection and should be secured to the structural backing with cinch, expansion screws or toggle bolts, as required; spaced and installed to ensure ample strength and

- rigidity. Rails and stiles shall be mortised and tenoned, work neatly mitered and membered, all butt joints made flush and smooth, and all permanent joints made up with water resistant glue. All fixtures shall be assembled without face screws or nails, except where it may be necessary to attach trim items. All face screws or nails that are necessary shall be countersunk and plastic wood or wood plugs used to cover head and the plug neatly touched up. The heads of all screws used in any assembly shall be countersunk below the surface.
- B. Joints: Mortise and tenon, spline, dowel and/or pin block and glue work to avoid use of nails wherever practical. Make butt joints with an approved device of prevention of separation of members. Blind nail and conceal.
- C. Plastic Laminate (HDPL): Plastic laminate shall be bonded to all exposed surfaces with contact cement fast bond #30, as manufactured by 3-M Products Company, or equal, to minimum ¾" fir faced plywood applied under high pressure. Reject plastic laminate or plastic backing shall be used to prevent warping, unless otherwise specified. All edges shall be carefully sanded to smooth finish, removing burns, nicks and cut marks.
  - 1. Plastic laminate joints shall be finished without wavy and unsightly joints. Joints need not be mitered except if specified. Hand sand edges to a slight chamfer.
- D. Doors, Hinged: Hinged doors shall be fabricated of ¾" thick plywood with plywood full perimeter edging with plastic laminate on face and self-edging on exposed sides. Door hinges, pulls and catches shall be supplied and installed as detailed. All doors to have minimum of 3 concealed, heavy duty, European hinges per section.
  - 1. Provide S.S. channel trim on the perimeter of the door to guard plastic laminate from chipping.
- E. Doors, Sliding: Sliding doors shall be fabricated of solid core plywood with hardwood edges and constructed similar to hinged doors. Doors shall be mounted on E-Z Glides track. Doors shall be removable without the use of tools. Rubber stops shall be provided concealed in end stile or mullion.
- F. Doors, Tambour Sliding: Tambour sliding doors shall be fabricated of individual hardwood slats, 3/8" by 3/4" round on 2 edges and glued to 20 ounce duck canvas or reject elastic vinyl plastic or equal and shall be provided with hardwood end stile with integral door pull. Track shall be lined with laminated plastic or equally smooth surface and guides at top and bottom shall be fabricated hardwood. Provide lock-pin for sliding doors.
- G. Access Panels/Louver Panels:
  - 1. Access Panels: Shall be fabricated of 3/4" thick marine grade plywood and shall be fabricated to be removable for access. Each access panel shall be provided

- with 2 magnetic catches at top and (2) 3/16" positioning pins at bottom (unless otherwise specified or detailed on drawings).
- 2. Louvered Panels: Are required in woodwork at all locations where proper ventilation is necessary for the efficient performance and operation (exhaust and/or supply) of the food service equipment compressor.

Types (when specified):

- a. Louvered panel spaced to conceal equipment yet provide adequate ventilation.
- Kitchen Equipment Contractor to coordinate size, quantity and location of louvered opening for sufficient ventilation of food service equipment. Refer to drawing details for cut-outs and spacing.
- 3. Unless otherwise directed, panels shall be powder coated to match laminate selection.
- H. Louvered Doors: Must have concealed hardware to resemble access panels. Doors to have nylon roller friction type heavy duty catch and heavy duty concealed S.S. adjustable hinge.
  - 1. Plastic laminate fronts: provide kiln dried pine shutter type slats. Wood to be free of knots with smooth grain, epoxy painted to match laminate selection. No raw wood surfaces will be acceptable. Paint or laminate as needed between slats.
  - 2. Slats to be fixed, positioned to conceal equipment from sight.
  - 3. Provide black color screening/mesh on rear of door with protective edges to prevent tearing.
- I. Drawers: Drawers shall have dovetail construction, well glued and blocked. Fronts shall be not less than 3/4" thick marine grade plywood. Sides and back shall be 1/2 " thick fabricated of Birch, Maple or Sycamore except where extension slides are used, in which case the side shall be 5/8" thick. Bottom shall be milled into fronts and sides. Drawers shall be provided with suitable stops. Provide pulls as detailed or specified.
  - 1. The inside surfaces of all drawers shall receive one coat of Penetrating Primer and one coat of glass lacquer.
- J. Painted Finishes: Painted finishes shall have exposed surfaces free from defects and blemishes that would show after being finished, regardless of grade specific. All surfaces specified to receive paint or enamel finish shall receive one crosscoat of lacquer type undercoat. The undercoat shall be of appreciable different color than that of the finish coat, and of proper ground color with relation to the finish coat. After the undercoat has been thoroughly dried, surfaces shall be sanded smooth and two coats of enamel shall be applied. Back painting shall be provided for all cabinet and woodwork prior to installation.

- K. Interior and Wall Shelves: Cabinet interiors and wall shelves shall be laminated as specified under Section C, Plastic Laminate.
- L. Granite Tops:
  - 1. Color and finish shall be selected by the Architect, and physical properties shall confirm to manufacturer's standard specifications for foodservice application. The material shall be homogenous; and not of a composite construction.
  - 2. Granite shall be 3/4" thick with 1-1/4" face for counter tops unless otherwise specified.
  - 3. General installed to conform to manufacturers standard details in order to maintain product warranty, i.e. cut outs for drop-in equipment.

# M. Solid Surface:

Of size and shape as shown. Top of minimum 1/2" thick Solid Surface, silicone mounted to 3/4" thick exterior grade plywood with ten year installation warranty. Solid Surface/S.S. fabrication, fabricated to comply with Solid Surface commercial specifications. Color of Solid Surface as selected by Architect. Top secured to counter base by means of concealed S.S. studs, nuts and washers. Angle frame under top sheathed with sound deadening material.

#### PART 2 - PRODUCTS

#### DISHWASH AREA

## ITEM #D1 SINK, HAND WITH SOAP DISPENSER – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HSA-10-FDPS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 58564 with 6" swing spout, 1/2" connections
- 1 ea. Emergency Eye Wash Unit, 326272
- · Wall backing by General Contractor

Or as manufactured by Advance Tabco or IMC/ Teddy.

ITEM #D2 HOSE REEL WITH GUN – QTY. AS PER PLAN & SCHEDULE

Fisher Model 29599. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. 35' hose length
- 1 ea. Install Kit, concealed piping, 28266
- All necessary components for full operation
- Wall backing by General Contractor

Or as manufactured by T&S Brass or Component Hardware.

# ITEM #D3 S.S. CHEMICAL CABINET – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Cabinet/ Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- Cylinder locks as required
- Intermediate stainless steel solid shelves, adjustable

Or as manufactured by BSI, LLC or South Jersey Metal.

#### ITEM #D4 3-COMPARTMENT SINK - QTY, AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 3 ea. Built-in work sinks, 27" L x 27" W x 14" D:
- 3 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 3 ea. Tail piece, Fisher Mfg. model 6129
- 3 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 24589 with 14" swing spout add-on faucet, 3/4" connections
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 51209 with 14" swing spout, 3/4" connections
- 2 ea. Stainless steel sheet pan holder, removable, (12) pan capacity
- Stainless steel common bowl skirt
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #D5 STORAGE SYSTEM, WALL MNTD. - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1860-E
- 1 ea. Wall uprights, vertical, PR45VU-E
- 8 ea. Grid/Mat clips, A223496
- 3 ea. Shelf, 1448-E
- 3 ea. Shelf Brackets, PR14B-E
- 2 ea. Grid Shelf, 1436WGS-E
- 3 ea. Baskets, WB-E
- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Metro or Focus.

# ITEM #D6 STORAGE SYSTEM, WALL MNTD. - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model WAL-STOR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting Height: 50" above finished floor
- 2 ea. Wall grid/mat, WM1848-E
- 1 ea. Wall uprights, vertical, PR45VU-E
- 8 ea. Grid/Mat clips, A223496
- 3 ea. Shelf, 1448-E
- 3 ea. Shelf Brackets. PR14B-E
- 2 ea. Grid Shelf, 1436WGS-E
- 3 ea. Baskets, WB-E
- 12 ea. Utility Hooks, UH-E
- 1 ea. Epoxy coated finish, entire wall system
- Wall backing by General Contractor

Or as manufactured by Metro or Focus.

ITEM #D7 SPARE NUMBER

# ITEM #D8 CLEAN DISH TABLE – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated Item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- No additional features, options or accessories required

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #D9 WAREWASHER, DOOR TYPE, HIGH TEMP. – QTY. AS PER PLAN & SCHEDULE

Hobart Model AM15 ELEC. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 480/3, Hardwired
- 1 ea. Single point electrical connection
- Verify direction of operation
- 1 ea. Corner design application
- 6 ea. Peg racks
- 4 ea. Combination racks
- 1 ea. Built-in hot water booster, 70° rise
- 1 ea. Detergent/rinse aid pumps
- 1 ea. Drain tempering kit
- 1 ea. Water hammer arrestor kit

Or as manufactured by Champion or Meiko.

# ITEM #D10 EXHAUST HOOD, TYPE II - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 304 stainless steel
- Structural front panel
- Length / size as per contract documents, wall/island canopy hood
- Stainless steel field wrap, approximately 12" high on all exposed sides
- Baffles shall be fully removable
- Full perimeter gutter with 1/2" stainless steel drain coupling

Or as manufactured by Accurex or Caddy.

# ITEM #D11 PRE-WASH SINK, BUILT-IN – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Built-in pre-wash sink, 21" L x 21" W x 7" D
- 1 ea. DrainKing waste valve
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 24589 with 14" swing spout add-on faucet, 3/4" connections
- 1 ea. 18 Gauge Stainless steel, removable perforated basket, 19" L x 19" W x 6" D
- 1 ea. 12 Gauge. Stainless steel, removable rack guide to fit over sink

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #D12 SOILED / DROP-OFF DISH TABLE – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- Stainless steel tubular open framing

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #D13 RACK SHELF, DUAL-SIDED - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- 1 ea. Drip tube, 1/2" diameter, verify left/right
- Posts support bracket thru table, welded to frame

Or as manufactured by BSI, LLC or South Jersey Metal.

ITEM #D14 SPARE NUMBER

# ITEM #D15 TRASH RECEPTACLE - QTY, AS PER PLAN & SCHEDULE

Rubbermaid Model FG352600GRAY. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Portable dolly, FG353000BLA
- 1 ea. Tuffmade Polyliner Bags, FG501688GRAY

Or as manufactured by Brute or Continental.

# ITEM #D16 DOLLY, RACK - QTY. AS PER PLAN & SCHEDULE

Channel Manufacturing Model GRD. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Corner bumpers, 022
- 1 ea. Pull hook, PH-10
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by New Age Industrial or Lockwood.

# ITEM #D17 DRYING RACK, PORTABLE - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model QDR2448-E. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 4 ea. 24" x 48" Shelves with removable, vented inserts
- 4 ea. 74" High uprights
- 2 ea. Tray drying rack, full shelf
- 1 ea. Drop-in tray drying rack, full shelf
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Focus or Metro.

### KITCHEN AREA

# ITEM #K1 CENTRAL FILTER SYSTEM – QTY. AS PER PLAN & SCHEDULE

A.J. Antunes/Roundup Model VZN441V-T5. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Electrical: 120/1, NEMA 5-15P

- 1 ea. Vertical 15 gallon, ultra filtration with carbon element
- 1 ea. TAC-5 cartdridge for lime scale reduction, self-cleaning
- 1 ea. Strainer kit, 7000519

No alternate manufacturers will be accepted for this item.

# ITEM #K2 MOP SINK STORAGE CABINET – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model F1916-VSCS-DL. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mop sink location, left section
- 1 ea. 304 Stainless steel construction
- 1 ea. Sloped top
- 1 ea. Hinged double doors with lockable handles
- 3 ea. Fixed shelf, cabinet section
- 1 ea. Fixed shelf with pole slot, mop sink section
- 1 ea. 4-Pole mop holder, 321561
- 1 ea. Hose and bracket, 312689
- 1 ea. Service faucet, 312690

Or as manufactured by Aero Mfg. or IMC/ Teddy.

## ITEM #K3 SINK, HAND WITH SOAP DISPENSER - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HSA-10-FDPS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 58564 with 6" swing spout, 1/2" connections
- Wall backing by General Contractor

Or as manufactured by Advance Tabco or IMC/ Teddy.

# ITEM #K4 SPARE NUMBER

# ITEM #K5 WALK-IN COOLER - QTY. AS PER PLAN & SCHEDULE

Norlake Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General

Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Pre-formed panels: 4" thick, polyurethane insulation
- Pre-formed floor panel: 4" thick, polyurethane insulation with integral 3/4" marine grade plywood
- Interior Floor Finish: Fully welded vinyl safety flooring
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. Interior ramp
- 1 ea. 36" x 78" door with vision panel
- 1 ea. Flush mount temperature alarm system, Modularm 75B
- 1 ea. Evaporator Coil Limit Switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels for compressor access
- Stucco stainless steel exterior where exposed, 20 Gauge

Or as manufactured by Kolpak or American Panel.

# ITEM #K6 REFRIGERATION TO ITEM #K5 – QTY. AS PER PLAN & SCHEDULE

Norlake Model NAWD150RL-3 with SA28-122B-AE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired, compressor unit
- Electrical: 120/1, Hardwired, evaporator coil
- Refrigeration: R-404A
- 1 ea. Evaporator coils mounted within walk-in box, suspended from ceiling
- 1 ea. Compressor units mounted on building roof
- 1 ea. Dunnage rack, rails or curb for compressor unit
- 1 ea. Weatherproof cowl
- 1 ea. Winterized controls

Or as manufactured by Kolpak or American Panel.

#### ITEM #K7 SPARE NUMBER

# ITEM #K8 SAFETY FLOORING, FULLY WELDED – QTY. AS PER PLAN & SCHEDULE

High Performance Floors Model TITAN. Unit to be installed where shown on drawings. Flooring to be applied throughout walk-in boxes, including interior

ramp, as detailed on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Sheet Material: 5' x 8' Dimensions, 1/4" thick minimum
- Color Selection: Dark Gray
- Finish Selection: Top Surface, Stipple
- Aluminum Edge Flashing: Cove cap mechanically fastened to wall over top of wall board
- Proper bonding agent to adhere to smooth aluminum
- Seams to be heat welded
- Stainless steel Corner Edge Guards mechanically fastened on all outside corners
- Ten year warranty

Or as manufactured by Protect-All or Altro.

# ITEM #K9 RACK, DUNNAGE – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model PD4822. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

No additional features, options or accessories are required

Or as manufactured by Focus or Metro.

# ITEM #K10 STORAGE SHELVING, PORTABLE - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model QPF-QA2148E-GL. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 5 ea. 21" x 48" Shelves with removable, vented inserts
- 4 ea. 64" High uprights
- Mounted on heavy-duty casters, front two with brakes

Or as manufactured by Focus or Metro.

## ITEM #K11 WALK-IN COOLER - QTY, AS PER PLAN & SCHEDULE

Norlake Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

• Electrical: 120/1, Hardwired

- Pre-formed panels: 4" thick, polyurethane insulation
- Pre-formed floor panel: 4" thick, polyurethane insulation with integral 3/4" marine grade plywood
- Interior Floor Finish: Fully welded vinyl safety flooring
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. Interior ramp
- 1 ea. 36" x 78" door with vision panel
- 1 ea. Flush mount temperature alarm system, Modularm 75B
- 1 ea. Evaporator Coil Limit Switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels for compressor access
- Stucco stainless steel exterior where exposed, 20 Gauge

Or as manufactured by Kolpak or American Panel.

## ITEM #K12 REFRIGERATION TO ITEM #K11 – QTY, AS PER PLAN & SCHEDULE

Norlake Model NAWD125RL-3 with SA28-97B-AE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired, compressor unit
- Electrical: 120/1, Hardwired, evaporator coil
- Refrigeration: R-404A
- 1 ea. Evaporator coils mounted within walk-in box, suspended from ceiling
- 1 ea. Compressor units mounted on building roof
- 1 ea. Dunnage rack, rails or curb for compressor unit
- 1 ea. Weatherproof cowl
- 1 ea. Winterized controls

Or as manufactured by Kolpak or American Panel.

# ITEM #K13 SAFETY FLOORING, FULLY WELDED - QTY. AS PER PLAN & SCHEDULE

High Performance Floors Model TITAN. Unit to be installed where shown on drawings. Flooring to be applied throughout walk-in boxes, including interior ramp, as detailed on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Sheet Material: 5' x 8' Dimensions, 1/4" thick minimum
- Color Selection: Dark Gray
- Finish Selection: Top Surface, Stipple

- Aluminum Edge Flashing: Cove cap mechanically fastened to wall over top of wall board
- Proper bonding agent to adhere to smooth aluminum
- Seams to be heat welded
- Stainless steel Corner Edge Guards mechanically fastened on all outside corners
- Ten year warranty

Or as manufactured by Protect-All or Altro.

### ITEM #K14 SPARE NUMBER

# ITEM #K15 STORAGE SHELVING, PORTABLE – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model QPF-QA2136E-GL. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 5 ea. 21" x 36" Shelves with removable, vented inserts
- 4 ea. 64" High uprights
- Mounted on heavy-duty casters, front two with brakes

Or as manufactured by Focus or Metro.

## ITEM #K16 WALK-IN FREEZER - QTY. AS PER PLAN & SCHEDULE

Norlake Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Pre-formed panels: 4" thick, polyurethane insulation
- Pre-formed floor panel: 4" thick, polyurethane insulation with integral 3/4" marine grade plywood
- Interior Floor Finish: Fully welded vinyl safety flooring
- Interior / Exterior diamond tread kick plate at door section, foamed in place
- 1 ea. 36" x 78" door with vision panel
- 1 ea. Flush mount temperature alarm system, Modularm 75B
- 1 ea. Evaporator Coil Limit Switch, mounted in interior door frame
- 1 ea. Removable louvered trim panels for compressor access
- Stucco stainless steel exterior where exposed, 20 Gauge

Or as manufactured by Kolpak or American Panel.

### ITEM #K17 REFRIGERATION TO ITEM #K16 – QTY. AS PER PLAN & SCHEDULE

Norlake Model LAWD200RL-3 with SE26-92B-DE. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired, compressor unit
- Electrical: 208/1, Hardwired, evaporator coil
- Refrigeration: R-404A
- 1 ea. Evaporator coils mounted within walk-in box, suspended from ceiling
- 1 ea. Compressor units mounted on building roof
- 1 ea. Dunnage rack, rails or curb for compressor unit
- 1 ea. Weatherproof cowl
- 1 ea. Winterized controls

Or as manufactured by Kolpak or American Panel.

## ITEM #K18 SAFETY FLOORING, FULLY WELDED – QTY. AS PER PLAN & SCHEDULE

High Performance Floors Model TITAN. Unit to be installed where shown on drawings. Flooring to be applied throughout walk-in boxes, including interior ramp, as detailed on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Sheet Material: 5' x 8' Dimensions, 1/4" thick minimum
- Color Selection: Dark Gray
- Finish Selection: Top Surface, Stipple
- Aluminum Edge Flashing: Cove cap mechanically fastened to wall over top of wall board
- Proper bonding agent to adhere to smooth aluminum
- · Seams to be heat welded
- Stainless steel Corner Edge Guards mechanically fastened on all outside corners
- Ten year warranty

Or as manufactured by Protect-All or Altro.

# ITEM #K19 STORAGE SHELVING, PORTABLE – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model QPF-QA2136-GL. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 5 ea. 21" x 36" Shelves with removable, vented inserts
- 4 ea. 64" High uprights
- Mounted on heavy-duty casters, front two with brakes

Or as manufactured by Focus or Metro.

# ITEM #K20 RACK, UNIVERSAL – QTY. AS PER PLAN & SCHEDULE

Channel Manufacturing Model AUR-12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

No additional features, options or accessories required

Or as manufactured by New Age Industrial or Lockwood.

## ITEM #K21 SPARE NUMBER

## ITEM #K22 STORAGE SHELVING, HIGH DENSITY - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model QPF-QA2136-GL. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 4 ea. 21" x 36" Shelves with removable, vented inserts
- 4 ea. 74" High uprights
- 5 ea. Stationary kit, EP74-E, per required units only
- 7 ea. Mobile unit kit, MUK2136-E, per required units only
- 1 ea. Overhead track unit, OHT-16
- 1 ea. Overhead track unit, OHT-10

Or as manufactured by Focus or Metro.

## ITEM #K23 FIRE EXTINGUISHER, WALL MNTD. - QTY. AS PER PLAN & SCHEDULE

Ansul Model K-CLASS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Wet chemical type, Ansulex low pH agent
- 1 ea. 2.5 Gallon tank

- 1 ea. Wall bracket
- 1 ea. Rechargeable
- Wall backing by General Contractor

Or as manufactured by Kidde or Range Guard.

# ITEM #K24 STAND, EQUIPMENT – QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model MMT3030S. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

• 1 ea. Pan rack slide base, 3" on center

Or as manufactured by Advance Tabco or IMC/ Teddy.

## ITEM #K25 SLICER, FOOD – QTY. AS PER PLAN & SCHEDULE

Hobart Model HS9-1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Automatic Type
- 1 ea. Lift device

Or as manufactured by Bizerba or Globe.

#### ITEM #K26 REFRIGERATOR, SANDWICH / SALAD PREP. - QTY. AS PER PLAN & SCHEDULE

True Food Service Model TSSU-60-24M-B-ST-ADA. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 2 ea. Barrel locks
- 1 ea. Composite cutting board
- 1 ea. Pan dividers
- 1 ea. Digital thermometer, external
- 1 ea. Stainless steel back
- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Continental Refrigerator or Norlake.

# ITEM #K27 PREP. TABLE, 2-COMPARTMENT – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- 1 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- Counter Top Material: Stainless Steel, 14 Gauge
- 2 ea. Built-in work sinks, 24" L x 18" W x 12" D
- 2 ea. S.S. Removable sink bowl covers
  - Stainless steel, 14 Gauge
  - Finger holes, lift-off
  - Flush inlay with work sinks/tops
  - Integral bracket, under counter, to hold when not in use
- 2 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 2 ea. Tail piece, Fisher Mfg. model 6129
- 2 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 60798 with 12" swing spout, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Stainless steel common bowl skirt
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

ITEM #K28 SPARE NUMBER

## ITEM #K29 OVERSHELF, SPLASH MNTD. - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- Posts support bracket thru splash, welded to frame

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K30 SLICER, VEGETABLE - QTY. AS PER PLAN & SCHEDULE

Piper Products Model GSM 4. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. F2-5, Slicing Disc
- 1 ea. G4-5, Slicing Disc
- 1 ea. G6-5, Slicing Disc
- 1 ea. SM3.5-5, Sickle Disc
- 1 ea. S2-5, Julienne Disc
- 1 ea. PA4K-5, Julienne Disc
- 1 ea. 0-5, Shredding Disc
- 1 ea. HS-5, Shaving Disc
- 1 ea. W8-5, Cubing Disc
- 1 ea. W10-5, Cubing Disc
- 7 ea. SCV-1, Storage Case
- 1 ea. SCH-3, Storage Case

No alternate manufacturers will be accepted for this item.

### ITEM #K31 BIN INGREDIENT - QTY, AS PER PLAN & SCHEDULE

Cambro Model IBS20-148. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

• 1 ea. CamWear scoop, 24 oz.

Or as manufactured by Rubbermaid or Continental.

#### ITEM #K32 WORK TABLE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- 1 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- Counter Top Material: Stainless Steel, 14 Gauge
- Stainless steel tubular open framing
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K33 MIXER, FLOOR – QTY. AS PER PLAN & SCHEDULE

Hobart Model HL300. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Bowl truck
- 1 ea. Bowl scraper
- 1 ea. Ingredient chute
- 1 ea. 30 Qt. bowl, stainless steel
- 1 ea. B Flat beater
- 1 ea. D Whip
- 1 ea. ED Dough arm

Or as manufactured by Univex or Globe.

## ITEM #K34 WORK TABLE W/ SINK - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Built-in work sink. 20" L x 16" W x 12" D each
- 1 ea. S.S. Removable sink bowl cover
  - Stainless steel, 14 Gauge
  - Finger holes, lift-off
  - Flush inlay with work sink/top
  - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 1 ea. Tail piece, Fisher Mfg. model 6129
- 1 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 57665 with 12" swing spout, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- · Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K35 SPARE NUMBER

### ITEM #K36 OVERSHELF, SPLASH MTND. – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- Posts support bracket thru splash, welded to frame

Or as manufactured by BSI, LLC or South Jersey Metal.

#### ITEM #K37 TRASH RECEPTACLE - QTY, AS PER PLAN & SCHEDULE

Rubbermaid Model FG354000GRAY. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Portable dolly, FG355300SSSTL
- 1 ea. Tuffmode Polyliner Bags, FG500988GRAY

Or as manufactured by Brute or Continental.

### ITEM #K38 BIN. ICE DISPENSING - QTY. AS PER PLAN & SCHEDULE

Follett Model DEV1010SG-48-75. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. SmartCART 75, 00112771
- 1 ea. Ice Paddle. ABICEPADDL46
- 1 ea. Guardian Scoop, 00146365

No alternate manufacturers will be accepted for this item.

#### ITEM #K39 ICE MACHINE, COMPRESSED STYLE – QTY. AS PER PLAN & SCHEDULE

Follett Model HCC1400ABT. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-20P
- Mounted on top of Item #K38
- Cold water connection piped from Central Filter System, Item #K1

No alternate manufacturers will be accepted for this item.

## ITEM #K40 SINK, HAND, WALL MOUNT - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HSAP-14-ADA-FW. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- ADA Compliant
- 1 ea. C-fold towel dispenser in front skirt
- 1 ea. Deck mounted soap dispenser
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 58564 with 6" swing spout, 1/2" connections
- 1 ea. Emergency Eye Wash Unit, 326272
- Wall backing by General Contractor

Or as manufactured by Advance Tabco or IMC/ Teddy.

#### ITEM #K41 HOSE REEL WITH GUN – QTY. AS PER PLAN & SCHEDULE

Fisher Model 29599. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. 35' hose length
- 1 ea. Install Kit, concealed piping, 28266
- All necessary components for full operation
- Wall backing by General Contractor

Or as manufactured by T&S Brass or Component Hardware.

#### ITEM #K42 SPARE NUMBER

## ITEM #K43 WORK COUNTER W/ SINK - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D
- 1 ea. S.S. Removable sink bowl cover
  - Stainless steel, 14 Gauge
  - Finger holes, lift-off
  - Flush inlay with work sink/top

- Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 1 ea. Tail piece, Fisher Mfg. model 6129
- 1 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 57665 with 12" swing spout, 1/2" connections
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- Cylinder locks, keyed alike, as required
- Intermediate stainless steel solid shelves, adjustable

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #K44 S.S. WALL CABINET(S) – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- 1 ea. Stainless steel shelf, adjustable
- 1 ea. Stainless steel bottom shelf, fixed
- 1 ea. Stainless steel enclosed bottom
- Wall backing by General Contractor

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K45 COFFEE MAKER, SATELLITE SYSTEM - QTY. AS PER PLAN & SCHEDULE

Bunn-O-Matic Model 20900.0008. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/1, hardwired
- 1 ea. Stainless steel brew basket
- 1 ea. Drip tray
- 6 ea. Thermal dispensers
- 1 ea. Half batch brewing option
- 500 ea. Paper filters
- Cold water connection piped from Central Filter System, Item #K1

Or as manufactured by Fetco or Curtis.

## ITEM #K46 RACK, UNIVERSAL - QTY. AS PER PLAN & SCHEDULE

Channel Manufacturing Model AUR-12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

No additional features, options or accessories required

Or as manufactured by New Age Industrial or Lockwood.

## ITEM #K47 ADA WORK TABLE W/ SINK - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- Counter Top Material: Stainless Steel, 14 Gauge
- ADA Compliant clearance 30" L x 19" W x 27" H
- 1 ea. Built-in work sink, tapered, 20" L x 16" W x 6" D each
- 1 ea. S.S. Removable sink bowl cover
  - · Stainless steel, 14 Gauge
  - Finger holes, lift-off
  - Flush inlay with work sink/top
  - Integral bracket, under counter, to hold when not in use
- 1 ea. Rear / off-set drain connection
- 1 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 57665 with 12" swing spout, 1/2" connections
- 1 ea. Work drawer assembly with removable cutting board
- Stainless steel undershelf, removable
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #K48 OVERSHELF, SPLASH MTND. – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- Posts support bracket thru splash, welded to frame

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K49 SPARE NUMBER

### ITEM #K50 POT RACK, CEILING MOUNT - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 80" above finished floor to underside
- 50 ea. Stainless steel pot-hooks

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K51 WORK TABLE - QTY, AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- Counter Top Material: Stainless Steel, 14 Gauge
- · Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #K52 COOLER BASE, 3-DOOR – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 1 ea. Directional exhaust fan, compressor housing
- 1 ea. Digital temperature control system
- 1 ea. Compressor slide-out bracket
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation

- Cylinder locks, keyed alike, as required
- Intermediate stainless steel wire shelves, adjustable
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

#### ITEM #K53 OVERSHELF, SPLASH MTND. - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- Posts support bracket thru splash, welded to frame

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K54 POT RACK, CEILING MOUNT - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 80" above finished floor to underside
- 50 ea. Stainless steel pot-hooks

Or as manufactured by BSI, LLC or South Jersey Metal.

#### ITEM #K55 WORK TABLE – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- Counter Top Material: Stainless Steel, 14 Gauge
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

ITEM #K56 SPARE NUMBER

# ITEM #K57 COOLER BASE, 3-DOOR – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 1 ea. Directional exhaust fan, compressor housing
- 1 ea. Digital temperature control system
- 1 ea. Compressor slide-out bracket
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- · Cylinder locks, keyed alike, as required
- Intermediate stainless steel wire shelves, adjustable
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K58 WORK COUNTER W/ SINK - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- 2 ea. GFCI duplex receptacles mounted in splash, S.S. cover plates
- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D
- 1 ea. S.S. Removable sink bowl cover
  - Stainless steel, 14 Gauge
  - Finger holes, lift-off
  - Flush inlay with work sink/top
  - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 1 ea. Tail piece, Fisher Mfg. model 6129
- 1 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 57665 with 12" swing spout, 1/2" connections
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- Cylinder locks, keyed alike, as required

- Intermediate stainless steel solid shelves, adjustable
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #K59 COOLER BASE, 2-DOOR - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 1 ea. Directional exhaust fan, compressor housing
- 1 ea. Digital temperature control system
- 1 ea. Compressor slide-out bracket
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- Cylinder locks, keyed alike, as required
- Intermediate stainless steel wire shelves, adjustable
- Flanged feet bolted to floor

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K60 OVERSHELF, SPLASH MTND. - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Mounting height: 56" above finished floor
- Posts support bracket thru splash, welded to frame

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #K61 BLAST CHILLER / SHOCK FREEZER – QTY. AS PER PLAN & SCHEDULE

Piper Products Model RCM121T. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

• Electrical: 208/3, Hardwired

- Verify door hinging
- Capacity: (12) 12" x 20" pans
- 1 ea. Sterilizing option
- 1 ea. Second food probe

Or as manufactured by American Panel or Thermal-Rite.

#### ITEM #K62 OVEN-STEAMER, COMBI, ELECTRIC – QTY. AS PER PLAN & SCHEDULE

Angelo Po Model FX82E3T. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/3, Hardwired
- Provided with 48" Electrical lead by E.C., K.E.C. to coordinate
- Capacity: (16) 12" x 20" hotel pans or (8) 18" x 26" full size sheet pans
- Verify door hinging
- 1 ea. Restraint cable
- 1 ea. Programmable controls with touch display
- 1 ea. (150) Cooking programs with favorites menu
- 1 ea. USB interface
- 1 ea. Automatic venting
- 1 ea. Humidity sensor
- 1 ea. Auto-reversible 5-speed fan
- 1 ea. Multi-point core temperature probe
- 1 ea. Double-glazed door with window
- 1 ea. Fully-automatic cleaning system
- 1 ea. Retractable spray gun, LDR610
- 1 ea. Stacking kit, KSFX82E
- 2 ea. Brightener, 11 lbs. tanks, BR55X
- 2 ea. Detergent, 11 lbs. tanks, CL55X
- 2 ea. Wire grid, G241X
- 1 ea. Certified Installation Program
- Mounted on heavy duty casters, front two with brakes
- Cold water connection piped from Central Filter System, Item #K1

Or as manufactured by Rational or Electrolux.

### ITEM #K63 SPARE NUMBER

### ITEM #K64 WATER FILTER, HARDNESS – QTY. AS PER PLAN & SCHEDULE

A.J. Antunes/Roundup Model HRS-200 with Water Meter. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Water Meter Kit, 7000976
- 3 ea. Replacement cartridges, 7000967
- Cold water connection piped from Central Filter System, Item #K1

Or as manufactured by Everpure or Pentair.

### ITEM #K65 OVEN, CONVECTION, GAS - QTY. AS PER PLAN & SCHEDULE

Southbend Model GS/25CCH. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (2)120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 180 MBtuh
- 1 ea. Manifold gas line for double unit
- 1 ea. Pressure regulator
- 2 ea. Solid state digital control with cook & hold and pulse plus
- 1 ea. Stainless steel exterior bottom
- 1 ea. Stainless steel back enclosure
- 1 ea. Extra oven racks
- 1 ea. 36" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty adjustable casters, front two with brakes

Or as manufactured by Vulcan or Garland.

### ITEM #K66 RANGE, HEAVY DUTY, GAS - QTY. AS PER PLAN & SCHEDULE

Southbend Model P36D-XX. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 1" Rear Connection, 225 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Flame failure for open top
- 1 ea. Electronic/Battery spark ignition
- 1 ea. Stainless steel rear
- 1 ea. Stainless steel exterior bottom
- 1 ea. 24" Stainless steel flue riser with 12" W x 36" L tubular overshelf
- 1 ea. 36" Quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty adjustable casters, front two with brakes

Or as manufactured by Vulcan or Garland.

## ITEM #K67 CHARBROILER, HEAVY DUTY, GAS - QTY. AS PER PLAN & SCHEDULE

Southbend Model P24C-CC. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Gas: 1" Rear connection, 64 MBtuh
- 1 ea. Pressure regulator
- 1 ea. 24" Stainless steel flue riser
- 1 ea. 36" quick disconnect with flexible hose
- 1 ea. Restraint cable
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Vulcan or Garland.

### ITEM #K68 FRYER BATTERY, GAS - QTY. AS PER PLAN & SCHEDULE

Dean Model SM140G. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 105 MBtuh
- 1 ea. Pressure regulator
- High Efficiency Burners
- 2 ea. Detachable splash shields, left/right
- 1 ea. Piezo ignitor
- 1 ea. Fryer, full pot
- 2 ea. Half size baskets
- 1 ea. Full size baskets
- 1 ea. Stainless steel frypot covers
- 1 ea. Food warmer, mounted at Drain Cabinet
- 1 ea. Standard controls
- 1 ea. Portable oil filter, MF90U/80#
- 1 ea. 36" quick disconnect with flexible hose
- 1 ea. Restraint cable
- Energy Star® Certified
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Frymaster or Pitco.

### ITEM #K69 FLOOR TROUGH - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model ASFT-1836-FG. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Anti-splash style
- 1 ea. Fibergrate style Micromesh, removable grate, ADA type, gridded fiberglass

Or as manufactured by Advance Tabco or IMC/ Teddy.

### ITEM #K70 SPARE NUMBER

#### ITEM #K71 TILT SKILLET - QTY, AS PER PLAN & SCHEDULE

Cleveland Range Model SGL30TR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 91 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Pan support carrier
- 1 ea. Pull-out sliding sink drawer
- 1 ea. Double pantry faucet
- 1 ea. Spark pilot ignition
- 1 ea. Power tilt with manual override
- 1 ea. Draw-off, 2" tangent

Or as manufactured by Southbend or Market Forge.

### ITEM #K72 STEAMER, CONVECTION - QTY. AS PER PLAN & SCHEDULE

Cleveland Range Model 24CGM200. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1. Hardwired
- Gas: 3/4" Rear Connection, 220 MBtuh
- 1 ea. Pressure regulator
- 1 ea. Electronic Timer, ETC2
- 1 ea. Insulated gas flue, 24SSF
- 1 ea. Descaling Solution, DISSOLVE
- Cold water connection piped from Water Filter, Item #K73

Or as manufactured by Southbend or Market Forge.

## ITEM #K73 WATER FILTER, HARDNESS – QTY. AS PER PLAN & SCHEDULE

A.J. Antunes/Roundup Model HRS-200 with Water Meter. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Water Meter Kit, 7000976
- 3 ea. Replacement cartridges, 7000967
- Cold water connection piped from Central Filter System, Item #K1

Or as manufactured by Everpure or Pentair.

### ITEM #K74 S.S. WALL PANEL(S) - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge
- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate s.s. trim strips, caps, gussets, etc...

Or as manufactured by Accurex or Caddy.

### ITEM #K75 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 304 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air / insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel

- Wall / Island canopy hood, length / size as per contract documents
- 2 ea. Front perforated supply plenum (PSP) with built-in 3" back standoff
- Insulation for PSP housing, as required
- 4 ea. 36" Flourescent light with bulbs
- Stainless steel field wrap, approximately 12" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package:
  - EMSplus11 modulating energy management system with smart controls
  - VFDs
  - Duct Temperature Sensors in all risers
  - Room Temperature Sensor
  - · Configurable through Touch Screen Interface
  - EMS Duct Thermostat
  - INVERTER DUTY THREE PHASE MOTORS REQUIRED

Or as manufactured by Accurex or Caddy.

## ITEM #K76 SUPPLY PLENUM, MAKE-UP AIR - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #K75

Or as manufactured by Accurex or Caddy.

#### ITEM #K77 SPARE NUMBER

## ITEM #K78 FIRE PROTECTION SYSTEM, BUILT-IN – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Mechanical Gas valve, up to 3", size to be verified
  - Provide add/ alternate for electric gas valve
- 1 ea. Reset Relay Push Button
  - · Only required with use of electric gas valve
- Included as part of Item #K75
- For the protection of equipment beneath Exhaust Hood, Item #K75

Or as manufactured by Accurex or Caddy.

### ITEM #K79 EXHAUST HOOD, CONTROL INTERFACE - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #K75

Or as manufactured by Accurex or Caddy.

## ITEM #K80 EXHAUST HOOD, CONTROL PANEL - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #K75

Or as manufactured by Accurex or Caddy.

### ITEM #K81 SINK, HAND WITH SOAP DISPENSER - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HSA-10-FDPS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 58564 with 6" swing spout, 1/2" connections
- Wall backing by General Contractor

Or as manufactured by Advance Tabco or IMC/ Teddy.

#### ITEM #K82 FIRE EXTINGUISHER, WALL MNTD. - QTY. AS PER PLAN & SCHEDULE

Ansul Model K-CLASS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Wet chemical type, Ansulex low pH agent
- 1 ea. 2.5 Gallon tank
- 1 ea. Wall bracket
- 1 ea. Rechargeable
- Wall backing by General Contractor

Or as manufactured by Kidde or Range Guard.

#### SERVERY AREA

## ITEM #S1 SERVING COUNTER, SOLID SURFACE – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/3, Hardwired
- Counter Components: Pre-wired to Built-In Electrical Panel, Item #S1A
- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall with extra panels
- Counter Top Material: KRION, Snow Series, Snow White 1100
- Plate/Tray Shelf: KRION, Snow Series, Snow White 1100
- Front Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- End Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- Working Side: •Stainless steel interior/exterior
  - Counter/Door to be flush frame design
  - •Stainless steel integrated handles, horizontal orientation
  - Cylinder locks, keyed alike, as required
  - •Intermediate stainless steel solid shelves, adjustable
  - •Stainless steel apron to mount switches, controls, etc.
  - •Directional exhaust fan, compressor housing
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, brushed finish
- Galvanized sheet metal counter templating for ease of installation

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #S1A LOAD CENTER, BUILT-IN - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/3, Hardwired, 125.0 AMP Panel
- Included as part of Item #S1

It is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within serving counter interior to junction boxes, outlets, etc., for equipment indicated, if required.

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #S2 PLATE / TRAY SHELF, SOLID SURFACE – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #S1, Serving Counter

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S3 DROP-IN, DISPLAY CASE, REFRIG. – QTY. AS PER PLAN & SCHEDULE

Piper Products Model OTR-3. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-20P
- Pre-wired to Item #S1A, Built-in Load Center
- 1 ea. Rear loading access doors
- 1 ea. Control panel remote mounted in apron
- 1 ea. Front roll-down night cover
- 1 ea. LED lighted shelves.

Or as manufactured by RPI Industries or Structural Concepts.

### ITEM #S4 TRASH RECEPTACLE - QTY. AS PER PLAN & SCHEDULE

Rubbermaid Model FG354000GRAY. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Portable dolly, FG355300SSSTL
- 1 ea. Tuffmode Polyliner Bags, FG500988GRAY

Or as manufactured by Brute or Continental.

# ITEM #S5 DROP-IN, HOT / COLD UNIT - QTY. AS PER PLAN & SCHEDULE

LTI Model QSCHP-2-H. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/1, NEMA 14-20P
- Pre-wired to Item #S1A, Built-in Load Center
- Verify compressor air flow orientation
- 1 ea. Self-contained refrigeration
- 1 ea. Individually controlled wells for hot or cold
- 1 ea. Controls remote mounted in apron
- 1 ea. Flange style, hugged edge
- Adaptor bars to hold combination of 1/1, 1/2, 1/3 and 1/6 sized pans
- 1 ea. Manifolded drain lines to gate/shut-off valve

Or as manufactured by Piper Products or Vollrath.

## ITEM #S6 FOOD PROTECTOR(S), ADJUSTABLE – QTY. AS PER PLAN & SCHEDULE

Premier Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Pre-wired to Item #S1A, Built-in Load Center
- LED Color: 3000K
- LED Strip lights mounted to posts, concealed wiring
- LED light mounting clips for extended lengths, as required
- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

#### ITEM #S7 SPARE NUMBER

### ITEM #S8 CHAR BROILER, HEAVY DUTY, GAS - QTY. AS PER PLAN & SCHEDULE

Garland Model GTBG36-AR36. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Gas: 3/4" Rear connection, 108 MBtuh
- 1 ea. Flush rear gas inlet
- 1 ea. Pressure regulator
- 1 ea. 36" quick disconnect with flexible hose
- 1 ea. Restraint cable

Or as manufactured by Star Mfg. or Southbend.

### ITEM #S9 EQUIPMENT STAND, PORTABLE - QTY. AS PER PLAN & SCHEDULE

Garland Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Overall Height: 26" AFF
- 1 ea. Universal slide base, 3" on center
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Star Mfg. or Southbend.

# ITEM #S10 GRIDDLE, HEAVY DUTY, GAS - QTY. AS PER PLAN & SCHEDULE

Garland Model GTGG36-G36M. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Pre-wired to Item #S1A, Built-in Load Center
- Gas: 3/4" Rear connection, 84 MBtuh
- 1 ea. Flush rear gas inlet
- 1 ea. Pressure regulator
- 1 ea. Electronic spark ignition
- 1 ea. Chrome griddle top, mirror polished
- 1 ea. 36" Quick disconnect with flexible hose
- 1 ea. Restraint cable

Or as manufactured by Star Mfg. or Southbend.

## ITEM #S11 EQUIPMENT STAND, PORTABLE - QTY. AS PER PLAN & SCHEDULE

Garland Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Overall Height: 26" AFF
- 1 ea. Universal slide base, 3" on center
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Star Mfg. or Southbend.

# ITEM #S12 FOOD PROTECTOR(S), ADJUSTABLE - QTY. AS PER PLAN & SCHEDULE

Premier Model FM1V-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/ vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

## ITEM #S13 DROP-IN, HOT / COLD UNIT - QTY. AS PER PLAN & SCHEDULE

LTI Model QSCHP-2-H. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/1, NEMA 14-20P
- Pre-wired to Item #S1A. Built-in Load Center
- Verify compressor air flow orientation
- 1 ea. Self-contained refrigeration
- 1 ea. Individually controlled wells for hot or cold
- 1 ea. Controls remote mounted in apron
- 1 ea. Flange style, hugged edge
- Adaptor bars to hold combination of 1/1, 1/2, 1/3 and 1/6 sized pans
- 1 ea. Manifolded drain lines to gate/shut-off valve

Or as manufactured by Piper Products or Vollrath.

#### ITEM #S14 SPARE NUMBER

## ITEM #S15 FOOD PROTECTOR(S), ADJUSTABLE - QTY. AS PER PLAN & SCHEDULE

Premier Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

• Electrical: 120/1, Hardwired

- Pre-wired to Item #S1A, Built-in Load Center
- LED Color: 3000K
- LED Strip lights mounted to posts, concealed wiring
- LED light mounting clips for extended lengths, as required
- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

### ITEM #S16 WORK COUNTER W/ SINK - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D
- 1 ea. S.S. Removable sink bowl cover
  - Stainless steel, 14 Gauge
  - Finger holes, lift-off
  - Flush inlay with work sink/top
  - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 1 ea. Tail piece, Fisher Mfg. model 6129
- 1 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 57665 with 12" swing spout, 1/2" connections
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- · Cylinder locks, keyed alike, as required
- Intermediate stainless steel solid shelves, adjustable

No alternate manufacturers will be accepted for this item.

# ITEM #S17 FREEZER, REACH-IN – QTY. AS PER PLAN & SCHEDULE

True Food Service Model STR2F-4HS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

• Electrical: 120/1, NEMA 5-15P

- Verify door hinging
- 1 ea. Self-contained refrigeration
- 4 ea. Half doors with locks
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system
- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty
- Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Continental Refrigerator or Norlake.

## ITEM #S18 RACK, UNIVERSAL - QTY. AS PER PLAN & SCHEDULE

Channel Manufacturing Model AUR-12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

No additional features, options or accessories required

Or as manufactured by New Age Industrial or Lockwood.

## ITEM #S19 FRYER BATTERY, GAS - QTY. AS PER PLAN & SCHEDULE

Dean Model SM140G. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: (3)120/1, NEMA 5-15P
- Gas: 3/4" Rear Connection, 210 MBtuh
- 1 ea. Pressure regulator
- High Efficiency Burners
- 2 ea. Detachable splash shields, left/right
- 2 ea. Piezo ignitor
- 2 ea. Fryer, full pot
- 4 ea. Half size baskets
- 2 ea. Full size baskets
- 2 ea. Stainless steel frypot covers
- 1 ea. Drain cabinet 2 ea. Standard controls
- 1 ea. Portable oil filter. MF90U/80#
- 1 ea. 36" quick disconnect with flexible hose
- 1 ea. Restraint cable
- Energy Star® Certified
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Frymaster or Pitco.

# ITEM #S20 REFRIGERATOR, SANDWICH / SALAD PREP. - QTY. AS PER PLAN & SCHEDULE

True Food Service Model TFP-48-18M. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 2 ea. Barrel locks
- 1 ea. Composite cutting board
- 1 ea. Pan dividers
- 1 ea. Exterior digital thermometer
- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Continental Refrigerator or Norlake.

### ITEM #S21 SPARE NUMBER

### ITEM #S22 REFRIGERATOR, REACH-IN - QTY. AS PER PLAN & SCHEDULE

True Food Service Model STR1R-2HS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1. NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 2 ea. Half doors with locks
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system
- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty
- Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Continental Refrigerator or Norlake.

## ITEM #S23 ADA HAND SINK, WALL MOUNT - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HSAP-14-ADA-FW. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- ADA Compliant
- 1 ea. C-fold towel dispenser in front skirt
- 1 ea. Deck mounted soap dispenser
- 1 ea. Stainless Steel faucet, Fisher Mfg. model 58564 with 6" swing spout and wrist action handles, 1/2" connections
- 1 ea. 0.35 gpm aerator
- 1 ea. Emergency Eye Wash Unit, 326272
- Wall backing by General Contractor

Or as manufactured by Advance Tabco or IMC/ Teddy.

# ITEM #S24 S.S. WALL PANEL(S) - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Stainless steel panels, evenly sized, 20 Gauge
- Installed from top of coved base to underside of hood, entire length
- Hairline joints sealed with S.S. trim strips
- Secured to wall with heat resistant mastic

It is the responsibility of the Kitchen Equipment Contractor to coordinate and make all appropriate cut-outs in paneling based on utility requirements in this location and apply appropriate s.s. trim strips, caps, gussets, etc...

Or as manufactured by Accurex or Caddy.

## ITEM #S25 EXHAUST HOOD, TYPE I - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 304 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air / insulation barriers at perimeter and top, 0" clearance to combustibles

- Structural front panel
- Wall / Island canopy hood, length / size as per contract documents
- 2 ea. 36" Fluorescent light with bulbs
- 1 ea. 48" Fluorescent light with bulbs
- Stainless steel field wrap, approximately 12" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package:
  - EMSplus11 modulating energy management system with smart controls
  - VFDs
  - Duct Temperature Sensors in all risers
  - Room Temperature Sensor
  - · Configurable through Touch Screen Interface
  - EMS Duct Thermostat
  - INVERTER DUTY THREE PHASE MOTORS REQUIRED

Or as manufactured by Accurex or Caddy.

## ITEM #S26 SPARE NUMBER

### ITEM #S27 FIRE PROTECTION SYSTEM, BUILT-IN – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawing in strict accordance to that described in General Specifications. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Provide connection to building Fire Alarm System
- 1 ea. Mechanical Gas valve, up to 3", size to be verified
  - Provide add/ alternate for electric gas valve
- 1 ea. Reset Relay Push Button
  - Only required with use of electric gas valve
- Included as part of Item #S25
- For the protection of equipment beneath Exhaust Hoods, Items #S25, #S38 and #S48

Or as manufactured by Accurex or Caddy.

### ITEM #S28 SPARE NUMBER

### ITEM #S29 EXHAUST HOOD, CONTROL INTERFACE - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #S25

Or as manufactured by Accurex or Caddy.

### ITEM #S30 EXHAUST HOOD, CONTROL PANEL - QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #S25

Or as manufactured by Accurex or Caddy.

## ITEM #S31 SERVING COUNTER, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/3, Hardwired
- Counter Components: Pre-wired to Built-In Electrical Panel, Item #S1A
- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall with extra panels
- Counter Top Material: KRION, Snow Series, Snow White 1100
- Tray Slide: KRION, Snow Series, Snow White 1100
- Plate/Tray Shelf: KRION, Snow Series, Snow White 1100
- Front Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- End Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- Working Side: •Stainless steel interior/exterior
  - Counter/Door to be flush frame design
  - •Stainless steel integrated handles, horizontal orientation
  - Cylinder locks, keyed alike, as required
  - •Intermediate stainless steel solid shelves, adjustable
  - •Stainless steel apron to mount switches, controls, etc.
  - •Directional exhaust fan, compressor housing
- Counter Heights: 36" Counter Top, 34" Tray Slide
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, scribed to floor
- Galvanized sheet metal counter templating for ease of installation

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #S32 PLATE / TRAY SHELF, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #S31, Serving Counter

Or as manufactured by BSI, LLC or South Jersey Metal.

#### ITEM #S33 DROP-IN, HEATED SHELF - QTY. AS PER PLAN & SCHEDULE

Piper Products Model D36050. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-15P
- Pre-wired to Item #S1A, Built-in Load Center
- Controls remote mounted in apron
- Thermostatically controlled zones
- Maximum temperature, 250° F

No alternate manufacturers will be accepted for this item.

### ITEM #S34 FOOD PROTECTOR(S), ADJUSTABLE - QTY. AS PER PLAN & SCHEDULE

Premier Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Pre-wired to Item #S1A, Built-in Load Center
- LED Color: 3000K
- LED Strip lights mounted to posts, concealed wiring
- LED light mounting clips for extended lengths, as required
- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

## ITEM #S35 SPARE NUMBER

## ITEM #S36 WARMER, PROTECTOR MNTD. – QTY. AS PER PLAN & SCHEDULE

Premier Model GRNH-72. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Pre-wired to Item #S1A, Built-in Load Center
- Concealed wiring thru food protector posts
- 1 ea. Built-in toggle/pilot switch
- 1 ea. Stainless steel housing color
- Mounted in Food Protector, Item #S34
- Mounting option: stainless steel hanger tabs

Or as manufactured by BSI, LLC or Hatco.

### ITEM #S37 OVEN, STONE HEARTH, GAS-FIRED – QTY. AS PER PLAN & SCHEDULE

Wood Stone Model WS-FD-6045-RFG-L-IR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1. NEMA 5-15P
- Gas: 3/4" Rear Connection, 160 MBtuh
- 1 ea. Stainless steel air intake/service panel, perforated
- 1 ea. Stainless steel mantle
- 1 ea. Base skirt surround
- 1 ea. Medium tool set, WS-TL-SET-M-GAS:
  - 1 ea. Loading peel (12" pies and smaller)
  - 1 ea. Loading peel (16" pies and smaller)
  - 1 ea. Utility peel
  - 1 ea. Medium brush set
  - 1 ea. Bubble hook
- 1 ea. Split stand, FD-6045, for custom handling
- 1 ea. Factory prepared for field façade application, full exterior
- 1 ea. Transport caster assembly, 000-010-1, set of four
- 1 ea. Spare Parts Service Kit, RP-0020-(NG/LP):
  - 1 ea. Smart Valve
  - 1 ea. Igniter
  - 1 ea. Igniter Gasket
  - 1 ea. Steel box, 6" x 6" x 4"

Or as manufactured by Earthstone or Beech.

### ITEM #S38 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 304 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air / insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel
- Wall / Island canopy hood, length / size as per contract documents
- Stainless steel field wrap, approximately 24" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package: Included as part of Item #S25, Exhaust Hood

Or as manufactured by Accurex or Caddy.

### ITEM #S39 SERVING COUNTER, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/3, Hardwired
- Counter Components: Pre-wired to Built-In Electrical Panel, Item #S39A
- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall with extra panels
- Counter Top Material: KRION, Snow Series, Snow White 1100
- Plate/Tray Shelf: KRION, Snow Series, Snow White 1100
- Front Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- End Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- Working Side: •Stainless steel interior/exterior
  - Counter/Door to be flush frame design
  - •Stainless steel integrated handles, horizontal orientation
  - Cylinder locks, keyed alike, as required
  - •Intermediate stainless steel solid shelves, adjustable
  - •Stainless steel apron to mount switches, controls, etc.

Directional exhaust fan, compressor housing

- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, brushed finish
- Galvanized sheet metal counter templating for ease of installation

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #S39A LOAD CENTER, BUILT-IN - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/3, Hardwired, 125.0 AMP Panel
- Included as part of Item #S39

It is the responsibility of the Electrical Contractor, in coordination with the Kitchen Equipment Contractor, to make final interconnections within serving counter interior to junction boxes, outlets, etc., for equipment indicated, if required.

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S40 PLATE / TRAY SHELF, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #S39, Serving Counter

Or as manufactured by BSI, LLC or South Jersey Metal.

### ITEM #S41 DROP-IN, HOT / COLD UNIT – QTY. AS PER PLAN & SCHEDULE

LTI Model QSCHP-4-H. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/1, NEMA 14-20P
- Pre-wired to Item #S39A, Built-in Load Center
- Verify compressor air flow orientation
- 1 ea. Self-contained refrigeration
- 1 ea. Individually controlled wells for hot or cold
- 1 ea. Controls remote mounted in apron

- 1 ea. Flange style, hugged edge
- Adaptor bars to hold combination of 1/1, 1/2, 1/3 and 1/6 sized pans
- 1 ea. Manifolded drain lines to gate/shut-off valve

Or as manufactured by Delfield or Piper Products.

#### ITEM #S42 SPARE NUMBER

## ITEM #S43 FOOD PROTECTOR(S), ADJUSTABLE – QTY. AS PER PLAN & SCHEDULE

Premier Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Pre-wired to Item #S39A, Built-in Load Center
- LED Color: 3000K
- LED Strip lights mounted to posts, concealed wiring
- LED light mounting clips for extended lengths, as required
- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

# ITEM #S44 HOT PLATE, GAS, STEP-UP – QTY. AS PER PLAN & SCHEDULE

Garland Model GTOG24-SU4. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Gas: 3/4" Rear Connection, 120 MBtuh
- 1 ea. Flush rear gas inlet
- 1 ea. Pressure regulator
- 1 ea. 36" Quick disconnect with flexible hose
- 1 ea. Restraint cable

Or as manufactured by Star Mfg. or Southbend.

## ITEM #S45 EQUIPMENT STAND, PORTABLE - QTY. AS PER PLAN & SCHEDULE

Garland Model Custom. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Overall Height: 26" AFF
- 1 ea. Universal slide base, 3" on center
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Star Mfg. or Southbend.

### ITEM #S46 FOOD PROTECTOR(S), ADJUSTABLE – QTY. AS PER PLAN & SCHEDULE

Premier Model FM1V-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/ vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

## ITEM #S47 WORK DRAWER(S), BUILT-IN - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Cabinet/Drawer to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- 1 ea. Self-closing drawer
- 1 ea. Drawer safety stop
- 1 ea. Stainless steel pan insert, full size removable

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S48 EXHAUST HOOD, TYPE I – QTY. AS PER PLAN & SCHEDULE

Captive Aire Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General

Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Construction: 100% 304 stainless steel
- Filters: Stainless steel captrate solo with hook
- Insulation: Integral air / insulation barriers at perimeter and top, 0" clearance to combustibles
- Structural front panel
- Wall / Island canopy hood, length / size as per contract documents
- 1 ea. 48" Fluorescent light with bulbs
- Stainless steel field wrap, approximately 12" high on all exposed sides
- Adjustable exhaust air volume control damper
- Hood Control Panel Package: Included as part of Item #S25, Exhaust Hood

Or as manufactured by Accurex or Caddy.

ITEM #S49 SPARE NUMBER

ITEM #S50 SPARE NUMBER

ITEM #S51 FOOD PROTECTOR(S), ADJUSTABLE – QTY. AS PER PLAN & SCHEDULE

Premier Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Pre-wired to Item #S39A, Built-in Load Center
- LED Color: 3000K
- LED Strip lights mounted to posts, concealed wiring
- · LED light mounting clips for extended lengths, as required
- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

## ITEM #S52 REFRIGERATOR, SANDWICH / SALAD PREP. - QTY. AS PER PLAN & SCHEDULE

True Food Service Model TFP-72-30M. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 3 ea. Barrel locks
- 1 ea. Composite cutting board, 2-section
- 1 ea. Pan dividers
- 1 ea. Exterior digital thermometer
- 1 ea. Removable cover, 2-section
- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Continental Refrigerator or Norlake.

## ITEM #S53 FOOD PROTECTOR(S), ADJUSTABLE - QTY. AS PER PLAN & SCHEDULE

Premier Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Pre-wired to Item #S39A, Built-in Load Center
- LED Color: 3000K
- LED Strip lights mounted to posts, concealed wiring
- LED light mounting clips for extended lengths, as required
- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

### ITEM #S54 WORK DRAWER(S), BUILT-IN – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in

General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Cabinet/Drawer to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- 1 ea. Self-closing drawer
- 1 ea. Drawer safety stop
- 1 ea. Stainless steel pan insert, full size removable

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #S55 REFRIGERATOR, PIZZA PREP. - QTY. AS PER PLAN & SCHEDULE

True Food Service Model TPP-67D-2. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Self-contained refrigeration
- 1 ea. Full length removable cutting board, 2-section
- 1 ea. Digital Thermometer, external
- 1 ea. Stainless steel finished back
- 3 ea. Barrel locks
- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Continental Refrigerator or Norlake.

#### ITEM #S56 SPARE NUMBER

# ITEM #S57 RACK, UNIVERSAL – QTY. AS PER PLAN & SCHEDULE

Channel Manufacturing Model AUR-12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

No additional features, options or accessories required

Or as manufactured by New Age Industrial or Lockwood.

# ITEM #S58 SINK, HAND WITH SOAP DISPENSER - QTY. AS PER PLAN & SCHEDULE

Eagle Group/Metal Masters Model HSA-10-FDPS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Soap dispenser
- 1 ea. Towel dispenser
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 58564 with 6" swing spout, 1/2" connections
- Wall backing by General Contractor

Or as manufactured by Advance Tabco or IMC/ Teddy.

# ITEM #S59 CABINET, HEATED, REACH-IN – QTY. AS PER PLAN & SCHEDULE

True Food Service Model STR1H-2HS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-20P
- Verify door hinging
- 2 ea. Half doors with locks
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system
- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, top / bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Continental Refrigerator or Norlake.

## ITEM #S60 REFRIGERATOR, REACH-IN - QTY. AS PER PLAN & SCHEDULE

True Food Service Model STR1R-2HS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 2 ea. Half doors with locks
- 3 ea. Stainless steel shelves per compartment, top section
- 1 ea. Digital temperature control system

- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty
- Energy Star® Certified
- Adjustable universal pan slides 1-1/2" O.C. to hold 18" x 26" or 12" x 20" pans, bottom section
- Mounted on heavy duty casters, front two with brakes

Or as manufactured by Continental Refrigerator or Norlake.

## ITEM #S61 WORK COUNTER W/ SINK - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Top Material: Stainless Steel, 14 Gauge
- 1 ea. Built-in work sink, 20" L x 16" W x 12" D
- 1 ea. S.S. Removable sink bowl cover
  - Stainless steel, 14 Gauge
  - Finger holes, lift-off
  - Flush inlay with work sink/top
  - Integral bracket, under counter, to hold when not in use
- 1 ea. Waste valve with lever, Fisher Mfg. model DrainKing
- 1 ea. Tail piece, Fisher Mfg. model 6129
- 1 ea. Waste overflow, Fisher Mfg.
- 1 ea. Stainless steel Faucet, Fisher Mfg. model 57665 with 12" swing spout, 1/2" connections
- Cabinet/Door to be flush frame design
- Stainless steel integrated handles, horizontal orientation
- Cylinder locks, keyed alike, as required
- Intermediate stainless steel solid shelves, adjustable

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S62 PANINI GRILLE, SMOOTH / RIDGED PLATE - QTY. AS PER PLAN & SCHEDULE

Electrolux Professional Model 603859 – HSPPA1. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-30P
- 1 ea. Spatula, 653625
- 1 ea. Cleaning brush, 653623
- 1 ea. Baking sheets, 653694

No alternate manufacturers will be accepted for this item.

ITEM #S63 SPARE NUMBER

ITEM #S64 OVEN, RAPID COOK – QTY. AS PER PLAN & SCHEDULE

Turbochef Model NGC-1280-1 (Tornado 2). Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-30P
- 1 ea. Aluminum Paddle
- 1 ea. Bottle of Oven Cleaner
- 1 ea. Bottle of Oven Guard
- 2 ea. Trigger Sprayers
- 2 ea. CrossFilm Model PFS solid basket
- 2 ea. CrossFilm Model PFP perforated basket
- 1 ea. CrossFilm Model JT 9-cup egg tray
- 2 ea. CrossFilm Model GC bowl with lid

Or as manufactured by MerryChef or Amana.

ITEM #S65 SPARE NUMBER

ITEM #S66 REFRIGERATOR, ROLL-IN – QTY. AS PER PLAN & SCHEDULE

True Food Service Model STR1RRI-1S. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Verify door hinging
- 1 ea. Self-contained refrigeration
- 1 ea. Full solid doors with locks
- 1 ea. Digital Thermometer, external
- 1 ea. Three year parts warranty
- 1 ea. Three year labor warranty

Or as manufactured by Continental Refrigerator or Norlake.

# ITEM #S67 RACK, UNIVERSAL - QTY. AS PER PLAN & SCHEDULE

Channel Manufacturing Model AUR-12. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

No additional features, options or accessories required

Or as manufactured by New Age Industrial or Lockwood.

## ITEM #S68 SERVING COUNTER, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall with extra panels
- Counter Top Material: KRION, Snow Series, Snow White 1100
- Plate/Tray Shelf: KRION, Snow Series, Snow White 1100
- Front Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- End Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- Working Side: •Stainless steel interior/exterior
  - Counter/Door to be flush frame design
  - •Stainless steel integrated handles, horizontal orientation
  - Cylinder locks, keyed alike, as required
  - •Intermediate stainless steel solid shelves, adjustable
  - •Stainless steel apron to mount switches, controls, etc.
  - Directional exhaust fan, compressor housing
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, brushed finish
- Galvanized sheet metal counter templating for ease of installation

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #S69 PLATE / TRAY SHELF, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

• Included as part of Item #S68, Serving Counter

Or as manufactured by BSI, LLC or South Jersey Metal.

ITEM #S70 SPARE NUMBER

ITEM #S71 SLOPED COLD PAN, DROP-IN, 7-WELL - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Verify compressor air flow orientation
- 1 ea. Self-contained refrigeration
- 1 ea. Controls remote mounted in apron
- 1 ea. Flange style, hugged edge
- 1 ea. Raised/Sloped rail cold pan
- Adaptor bars to hold combination of 1/1, 1/2, 1/3 and 1/6 sized pans
- 1 ea. Manifolded drain lines to gate/shut-off valve
- 1 ea. Removable false bottom

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S72 FOOD PROTECTOR(S), CURVED – QTY. AS PER PLAN & SCHEDULE

Premier Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Top glass, curved as per plan
- LED Color: 3000K
- LED Strip lights mounted to posts, concealed wiring
- LED light mounting clips for extended lengths, as required
- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

# ITEM #S73 CABINET, MOBILE, WARM & HOLD - QTY. AS PER PLAN & SCHEDULE

Alto-Shaam Model 750-S. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Door lock with key
- 1 ea. Stainless steel shelf, SH-2326
- Mounted on 2 ½" casters, to fit under 34" AFF counter height

Or as manufactured by Cres Cor or F.W.E.

#### ITEM #S74 INDUCTION RETHERMALIZER - QTY. AS PER PLAN & SCHEDULE

Vollrath Model 74110110. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 3 ea. Round inset, 11 qt.
- 3 ea. Hinged lid

No alternate manufacturers will be accepted for this item.

## ITEM #S75 SERVING COUNTER, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall with extra panels
- Counter Top Material: KRION, Snow Series, Snow White 1100
- Plate/Tray Shelf: KRION, Snow Series, Snow White 1100
- Front Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- End Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- Working Side: •Stainless steel interior/exterior
  - Counter/Door to be flush frame design
  - •Stainless steel integrated handles, horizontal orientation
  - •Cylinder locks, keyed alike, as required
  - •Intermediate stainless steel solid shelves, adjustable
  - •Stainless steel apron to mount switches, controls, etc.

•Directional exhaust fan, compressor housing

- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, brushed finish
- Galvanized sheet metal counter templating for ease of installation

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S76 PLATE / TRAY SHELF, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #S75, Serving Counter

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #S77 SPARE NUMBER

# ITEM #S78 SLOPED COLD PAN, DROP-IN, 7-WELL – QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Verify compressor air flow orientation
- 1 ea. Self-contained refrigeration
- 1 ea. Controls remote mounted in apron
- 1 ea. Flange style, hugged edge
- 1 ea. Raised/Sloped rail cold pan
- Adaptor bars to hold combination of 1/1, 1/2, 1/3 and 1/6 sized pans
- 1 ea. Manifolded drain lines to gate/shut-off valve
- 1 ea. Removable false bottom

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S79 FOOD PROTECTOR(S), CURVED – QTY. AS PER PLAN & SCHEDULE

Premier Model TM2N-A. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, Hardwired
- Top glass, curved as per plan
- LED Color: 3000K
- LED Strip lights mounted to posts, concealed wiring
- LED light mounting clips for extended lengths, as required
- 1" Tubular Stainless steel Posts
- Extend 20" above counter top, overall height
- Anchored below to counter frame for rigidity
- Stainless steel sleeve post extends thru counter top
- 1/2" Tempered glass, horizontal/vertical surfaces

Or as manufactured by BSI, LLC or Versa-Gard.

## ITEM #S80 SELF SERVE CASE, REFRIG., DROP-IN - QTY. AS PER PLAN & SCHEDULE

Structural Concepts Model DO4816R. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- 1 ea. Self-contained refrigeration, Breeze™ with Energy Wise, rear access
- 1 ea. Full depth display riser
- Stainless steel Exterior Finish
- Stainless steel Interior Finish
- 1 ea. Removable wire security cover, locking

Or as manufactured by ASDI or Federal Industries.

## ITEM #S81 BEVERAGE COUNTER, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall with extra panels
- Counter Top Material: KRION, Snow Series, Snow White 1100
- Plate/Tray Shelf: KRION, Snow Series, Snow White 1100
- Front Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- End Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- Cabinet Base: •Millwork door panels, (3) concealed hinges per door
  - Routed finger pull, entire length

- Cylinder locks, keyed alike, as required
- •Stainless steel interior finish with adjustable shelves
- Directional exhaust fan, compressor housing
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, scribed to floor
- Galvanized sheet metal counter templating for ease of installation

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #S82 COFFEE MAKER, SATELLITE SYSTEM – QTY. AS PER PLAN & SCHEDULE

Bunn-O-Matic Model 20900.0008. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/1, hardwired
- 1 ea. Stainless steel brew basket
- 1 ea. Drip tray
- 6 ea. Thermal dispensers
- 1 ea. Half batch brewing option
- 500 ea. Paper filters
- Cold water connection piped from Central Filter System, Item #K1

Or as manufactured by Fetco or Curtis.

## ITEM #S83 THERMAL SERVER - QTY. AS PER PLAN & SCHEDULE

Bunn-O-Matic. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as part of Item #S82, Coffee Maker

Or as manufactured by Fetco or Curtis.

## ITEM #S84 SPARE NUMBER

#### ITEM #S85 BEVERAGE DISPENSER(S) – QTY. AS PER PLAN & SCHEDULE

Vendor Supplied. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Electrical: 120/1, NEMA 5-15P

# ITEM #S86 DISPENSER, ICE / BEVERAGE - QTY. AS PER PLAN & SCHEDULE

Follett Model VU155B8RL. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15P
- Used in conjunction with Item #S87, Ice Machine
- Cold water connection piped from Central Filter System, Item #K1

No alternate manufacturer will be accepted for this Item.

## ITEM #S87 ICE MACHINE, COMPRESSED STYLE - QTY. AS PER PLAN & SCHEDULE

Follett Model HCC700AVS. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, NEMA 6-15P
- 1 ea. SafeCLEAN™ ice machine cleaner
- Cold water connection piped from Central Filter System, Item #K1

No alternate manufacturers will be accepted for this item.

## ITEM #S88 SPARE NUMBER

## ITEM #S89 OPEN DISPLAY CASE, REFRIGERATED – QTY. AS PER PLAN & SCHEDULE

Howard McCray Model SC-OD35E-4-LS-RR. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/208/1, L14-20P
- 1 ea. Self-contained refrigeration
- 1 ea. Electric condensate evaporator
- 1 ea. Interior LED lighting per shelf, 3000K
- 1 ea. Sound reduction package
- 1 ea. Roll down security shutter with lock, built-in
- 1 ea. #4 Finish stainless steel exterior finish
- 1 ea. #4 Finish stainless steel louver
- 1 ea. Mirrored polished interior ends
- 1 ea. Perforated back panel
- 2 ea. Side panel extensions with integrated stand-offs
- Additional filler panels to match as required, K.E.C. to verify prior to submittal

Or as manufactured by Structural Concepts or ASDI.

## ITEM #S90 SODA SYSTEM RACK - QTY. AS PER PLAN & SCHEDULE

Perfection Model PE-10-BIB. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- 1 ea. Bag-In-Box rack w/ top shelf
- Rack to accommodate (1) Model GR-4F
- Rack to accommodate (10) syrup containers

System shall come complete with all necessary prefabricated insulated lines, station fittings, connectors, water filters, water regulators, high and low pressure CO2 regulators, and bag-in-box pumps, as required. Installation shall be effected by Perfection Equipment authorized agents.

No alternate manufacturers will be accepted for this item.

#### ITEM #S91 SPARE NUMBER

# ITEM #S92 SODA SYSTEM, AIR-COOLED - QTY. AS PER PLAN & SCHEDULE

Perfection Model GR-4F. Unit to be installed where shown on drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 208/1, Hardwired
- Fluidic controlled
- 1 ea. Recirculating carbonator
- Interconnected to (1) 10-faucet Ice/Soda Dispenser (provided by others)
- 1 ea. One year parts and labor warranty
- 1 ea. Four year extended compressor warranty
- Cold water connection piped from Central Filter System, Item #K1

System shall come complete with all necessary prefabricated insulated lines, station fittings, connectors, water filters, water regulators, high and low pressure CO2 regulators, and bag-in-box pumps, as required. Installation shall be effected by Perfection Equipment authorized agents.

No alternate manufacturers will be accepted for this item.

# ITEM #S93 IMPULSE COUNTER, STEPPED DISPLAY - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as a part of Item #S94, Cashier Counter

Or as manufactured by BSI, LLC or South Jersey Metal.

# ITEM #S94 CASHIER COUNTER, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall with extra panels
- Counter Top Material: KRION, Snow Series, Snow White 1100
- Plate/Tray Shelf: KRION, Snow Series, Snow White 1100
- Front Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- End Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- Working Side: •Stainless steel finished interior
  - Stainless steel tubular foot rest, 2" diameter
  - •Quad receptacle mounted in rear panel
  - Cord/Plug assembly
  - •Directional exhaust fan, compressor housing
  - Locking cash drawer
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, brushed finish
- Galvanized sheet metal counter templating for ease of installation

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S95 IMPULSE COUNTER, STEPPED DISPLAY - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

Included as a part of Item #S96, Cashier Counter

Or as manufactured by BSI, LLC or South Jersey Metal.

## ITEM #S96 CASHIER COUNTER, SOLID SURFACE - QTY. AS PER PLAN & SCHEDULE

EMI New Jersey Model Custom. Size, shape and installed where shown on drawing. This is a fabricated item and is to be constructed as described in General Specifications and as further detailed on contract drawings. Provided with all features, options and accessories, per quantity required, as indicated:

- Electrical: 120/1, NEMA 5-15R
- Counter Components: Outlets/Junction boxes for drop-in or built-in equipment mounted in counter by K.E.C., wired by E.C.
- Counter Construction: 1" Stainless steel square tubing fully welded with integral chase wall with extra panels
- Counter Top Material: KRION, Snow Series, Snow White 1100
- Plate/Tray Shelf: KRION, Snow Series, Snow White 1100
- Front Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- End Panels: 3 Coat Paint System, Scuffmaster, Ambient Design
- Working Side: •Stainless steel finished interior
  - •Stainless steel tubular foot rest, 2" diameter
  - •Quad receptacle mounted in rear panel
  - Cord/Plug assembly
  - Directional exhaust fan, compressor housing
  - Locking cash drawer
- Counter Heights: 34" Counter Top
- Counter Base: Stainless steel legs, 6" adjustable with 16 GA removable kick plate, brushed finish
- Galvanized sheet metal counter templating for ease of installation

Or as manufactured by BSI, LLC or South Jersey Metal.

### PART 3 - EXECUTION

#### 3.1 GENERAL RELATED CONDITIONS

- A. In each item of equipment hereinafter specified under the "Equipment Schedule," these specifications shall only identify each respective item by name and number, as well as list various component parts provided for same.
- B. Therefore, it shall be intended that these respective items and their component parts shall be of material (mounted where applicable) constructed and furnished in strict

- accordance to that described in the general specifications for these items and integrally constructed where applicable.
- C. It shall also be intended that where buy-out (pre-fabricated) items are specified, same shall be definitely furnished with all the accessories as normally furnished by manufacturer for these items. Also in strict accordance with current manufacturer's engineering data sheet for each respective item.

# 3.2 EXAMINATION OF PLANS AND SPECIFICATIONS

A. Prospective bidders for this work must examine these plans and specifications carefully before bidding, and must request from Architect in writing for an interpretation or correction of every apparent ambiguity, inconsistency or error therein. If necessary, such interpretation or correction shall be issued in writing as an addendum. No calls will be accepted.

#### 3.3 SPECIAL NOTES

- A. It shall be the responsibility of Kitchen Equipment Contractor to keep up to date with progress made in field on installation of all necessary roughing to adequately and properly operate and accommodate all equipment furnished by Kitchen Equipment Contractor and as shown on drawings, to make as many visits to the job site as is necessary to check and assure that all roughing is being properly installed to accommodate this equipment. Include this service in bid.
- B. Kitchen Equipment Contractor to cooperate with all trades so that the end results of his work will be a satisfactory, approved and accepted installation. Written reports of each visit shall be sent promptly to the Architect and the Food Service Consultant.

#### 3.4 COORDINATION

- A. Procedure of construction is of paramount importance in executions of this project. Kitchen Equipment Contractor to carry on his work so that no delay in his operations or those of any other contractors occurs at any time.
- B. Kitchen Equipment Contractor to verify with Architect as to opening date of the food service area, and schedule his fabrication and purchasing of equipment so that all will be in readiness, installed, connected, tested, demonstrated, etc., in ample time prior to the scheduled opening date.

## 3.5 DELIVERY AND INSTALLATION

A. Shall mean and intend that Kitchen Equipment Contractor shall deliver and assemble all equipment of contract in 1 piece in required locations in building, ready for water, waste, gas, electric and ventilating connections required by other contractors. Any pieces of equipment may be delivered sectionally, but all working surfaces butt-welded, ground and polished on premises so that upon completion, such item of equipment will have true, smooth, even and continuous surfaces. Butt joining and filling with solder not permitted. Kitchen Equipment Contractor must verify door sizes, delivery platform, elevator size, etc., effecting delivery to food service areas for all items of equipment.

#### 3.6 RESERVATIONS AND CONDITIONS

- A. It is the intent of this specification to complete the installation of all equipment covered herein in all phases ready for operation. Contractor shall carefully examine the plans and specifications for building construction contracts and determine therefrom the extent of his operations in all respects. All labor and materials not included in building construction contracts necessary to accomplish this intent are hereby included in this contract.
- B. Kitchen Equipment Contractor shall attend job meetings when required for purpose of coordinating his work with other trades.
- C. All equipment shall be received at the building fully protected. It will be the responsibility of the Kitchen Equipment Contractor to protect the equipment until completely installed and accepted.
- 3.7 NOT APPLICABLE

**END OF SECTION** 

#### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Theatrical rigging includes equipment assemblies, systems and components required for locating scenic, acoustic, lighting and masking elements in variable vertical planes within the performance space. This also includes the human-machine interface for motorized rigging systems. The control system interface shall be divided into a front of house zone and a stage rigging zone.

#### B. Section Includes:

- 1. Work in the following space:
  - a. Proscenium Theatre
- 2. Provide systems including:
  - a. House Curtain Traveler Track and Associated Rigging
  - b. Performance Traveler Tracks
  - c. Side Tab Traveler Tracks
  - d. Automated rigging linesets fixed speed
  - e. Automated front of house lighting pipes fixed speed
  - f. Front of house supplemental mounting steel, attachments, hangers, bracing
  - g. Miscellaneous Manual Rigging Equipment
- 3. Additional support structures as required to meet the intent of the Contract Documents
- 4. Provision of materials, components, modifications, assemblies, equipment and services as specified herein. These include, but are not limited to:
  - a. Verification of site dimensions and conditions
  - b. Submittals as required by the Contract Documents
  - c. Submission of Shop Drawings performed, signed and sealed by a Professional Engineer experienced in work of similar nature and scope, and licensed to practice by the appropriate governing authority in the state which the Work is provided
  - d. Design and engineering of equipment and systems as required by the Contract Documents
  - e. Manufacture of equipment and systems as required by the Contract Documents
  - f. Scheduling, sequencing and coordination with other trades

- g. Site supervision of equipment and systems installation specified herein and elsewhere in the Contract Documents
- h. Testing and demonstration of equipment and systems as specified herein and elsewhere in the Contract Documents
- i. Record Drawings and "Operating and Maintenance Manuals" (O&M)
- j. Instruction to Owner's representatives
- C. Products Installed But Not Furnished Under This Section:
  - Stage Drapery as fabricated under Section 11 61 43: Theatrical Draperies
- D. Related Sections:
  - 1. Division 5: Metals
  - 2. Division 9: Finishes
  - 3. Division 11: Equipment:
    - a. Section 11 61 35: Theatrical Equipment Controls
      - i. Equipment control panels and graphic displays
      - ii. Portable hand-held controller and receptacles
      - iii. An integrated emergency stop system and status display for all Theatrical Equipment
    - b. Section 11 61 43: Theatrical Draperies
    - Section 27 41 16.61: Integrated Audio-Video Systems and Equipment for Theatres
  - 4. Division 26: Electrical:
    - a. Section 26 00 00: Electrical Requirements
    - b. Section 26 61 11: Theatrical Dimming and Controls

#### 1.2 REFERENCES

- A. American Institute of Steel Construction (AISC) Manual of Steel Construction
- B. American Welding Society (AWS) Code for Welding
- C. American National Standards Institute (ANSI)
- D. American Society for Testing and Materials (ASTM)
- E. National Electrical Manufacturers Association (NEMA)
- F. National Fire Protection Association (NFPA) National Electric Code (NEC)

# G. Underwriters Laboratories (UL)

#### 1.3 SYSTEM DESCRIPTION

## A. Performance Requirements:

- 1. Hoist system and control system shall be from the same manufacturer.
- 2. The following establishes minimum safety requirements for the system. Where federal, state and local legislation address these topics, the more stringent requirements shall take precedence. Factors listed below in no way relieve the Contractor from the sole responsibility of providing safe systems.
- 3. Provide electrical devices and components that are NEMA and UL approved for the applications. Perform wiring and electrical service by a licensed electrician. Conform to applicable codes.
- 4. Provide materials that are new, unused, and of the latest design.
- 5. Minimum design factor for lifted loads: 8:1.
  - a. Design factor shall include the effects of static loads, dynamic impact loads, and reductions for end terminations and bending ratios.
  - b. Include dynamic impact loads in the design of all components.
  - c. The minimum impact factor may be assumed as 33 percent of the static load. Alternately, the Contractor may calculate the impact factor based on the selected hoist components, loads, and hoist speeds.
  - d. Submit calculations for approval by the Architect and Engineer of Record. The calculations shall include the effect of an emergency stop while lowering the load at maximum speed. In no case may the impact factor be less than 15 percent of the static load.
  - Increase the design factor for ropes where normal operating loads include cyclic dynamic loads to suit the system operational requirements for required service life.
- 6. Minimum design factor for static loads: 6:1.
- 7. Cable bending ratio:
  - a. Manually operated systems: Cable diameter x 30.
  - b. Motorized systems: Comply with wire rope manufacturer's minimum recommended bending ratio for the style and grade of wire rope.
- 8. Maximum Fleet Angle: 1.5 degrees.
- 9. Gear motors: Minimum Class B insulation, totally enclosed fan ventilated (TEFC).
- 10. Gear motor reducers: AGMA load classification of 1 and minimum mechanical service factor of 1.25.

- 11. Gear motor brakes: Minimum retarding torque equal to 200 percent of the motor full load torque.
- 12. Bearings: Two (2) times required load at full speed for 2000 hours.
- 13. System Power: 208V 3 Ø: 100A
  - a. Provide step-up transformer to 480v as required for hoist power requirements.
- B. The system shall comply with NFPA 79, 2012 Electrical Standard for Industrial Machinery
- C. Provide general purpose hoist with the following features Quantity 12:
  - 1. Fixed speed: 30 feet per minute
  - 2. Payload capacity: 900 lbs above batten self-weight
- D. Provide front of house lighting hoist with the following features Quantity 2:
  - 1. Fixed speed: 30 feet per minute
  - 2. Payload capacity: 900 lbs above batten self-weight
  - 3. Integrated performance lighting circuit raceway and cable management system.
- E. Drives shall be distributed, one per hoist, located on the hoist frame.
- F. Hoists shall employ an integrated backbone to support all components which is then in turn secured to existing building steel.
- G. Provide assemblies, cable components, connections, equipment, hardware and linkages employed in supporting, in whole or in part, overhead loads that are rated and designed for that application. Base loading for each component on the maximum percentage of the capacity of the set in which the component is employed. For design purposes, base the minimum set capacity on the batten length multiplied by a thirty (30) pound per linear foot (plf) load unless indicated otherwise herein.
- H. Provide mule blocks, rollers and guides as required to provide proper alignment and maintain allowable fleet angles.
- I. Do not substitute cast iron components for arbor top and bottom members and clamps for attaching loft and head blocks to the support structure.
- J. Provide systems designed to reflect industry standard safeguards and precautions related to normal use of the equipment under ideal operating and loading conditions.

#### 1.4 SUBMITTALS

A. Provide Submittals in accordance with Division 1. Submit in a timely manner, allowing sufficient time for adequate review and possible resubmittal without jeopardizing the project schedule.

## B. Shop Drawings:

- 1. Submit Shop Drawings within ninety (90) days of award of contract.
- 2. Provide complete Submittals. No partial Submittals shall be allowed.
- 3. Drawings will show all information necessary to explain fully the design features, appearance, function, fabrication, installation and use of system components in all phases of operation.
- 4. Make engineering studies, calculations, models, and reports part of the Shop Drawing Submittal.
- 5. Fabrication, installation and erection shall not commence until Shop Drawings have been reviewed and marked by the Architect.
- 6. All sheets in the Submittal shall be of the same size.
- 7. Submittal shall have a title sheet listing included sheets.
- 8. A professional engineer licensed in the state of the manufacture of the equipment shall stamp Drawings.

#### C. Record Documents:

- 1. Submit Record Documents in accordance with Division 1.
- 2. Bind all O&M documentation separate from general building sections so they can be turned over to the users after approval.
- 3. Provide draft copy of completed manuals for review to the Theatre Consultant before the start of commissioning.
- 4. Operations and Maintenance Manuals, in quantities of three (3), shall include:
  - a. Contact information for the Contractor and pertinent manufacturers
  - b. Safety and Operational Instructions
  - c. Complete parts and subassembly list
  - d. Equipment design parameters such as safe working loads and duty cycles
  - e. Wiring diagrams and termination schedules
  - f. Periodic Maintenance Schedule
  - g. Maintenance procedures for finishes
  - h. Certificates of compliance with applicable codes
  - i. Records of final testing and log

- j. Spare parts list and source information
- k. Warranty documentation
- In addition to the requirements referenced above, provide record copy shop drawings for archival and reference usage as part of the O & M manuals:
  - i. Reduced size, 11 by 17 inches preferred, hardcopy prints
  - ii. Universal electronic format files, .pdf file type is preferred, as full size printable sheets. Submit files on standard pc format CD clearly labeled including project name, project architect, theatre consultant, contractor name, date of submittal.
- 5. Include diagrams depicting the system layout and maximum load limitations (drawn not less than 1/4 inch = 1'-0").
- 6. Provide three (3) hard copies of all Shop Drawings, including any updates or revisions to the original submission.
- 7. Provide the following electronic files:
  - a. Shop Drawings in their native electronic files (AutoCAD or similar)
  - b. All Submittal files, including shop drawings, in a Portable Document File (.pdf) format

## D. Continuing Service Proposal:

- 1. Provide a proposal, separate from the bid, for continuing semi-annual visits to the installation for inspection and maintenance of the supplied systems.
  - a. Provide a proposal for the first visit to occur eighteen (18) months after the date of hand-over and to continue forward for a five (5) year period after the date of commencement. Identify all terms of the proposal.
  - b. The Proposal shall remain valid and extended until the date of hand-over at which time the Owner may accept or reject the Proposal without prejudice.
  - c. Warranty site visits as specified in the Contract Documents are specifically excluded from the Continuing Service Proposal and, as such, are to be provided irrespective of acceptance or rejection of the Proposal.

#### 1.5 QUALITY ASSURANCE

- A. Contractor: A firm with a minimum of five (5) years of experience in the type of work required by this Section.
- B. Installers: Skilled technicians who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and best industry practices for the proper installation of the Work.
  - 1. Supervisors and site installation foreman shall be ETCP Certified

- C. Welding Standards: Comply with applicable provisions of AWS D1.1.
  - Engage welders who have satisfactorily passed AWS qualification tests for welding processes involved and are currently certified for these processes.
  - 2. Provide a copy of welding certificates held by welders employed in the fabrication or installation of the Work upon request.

#### 1.6 SCHEDULING & SEQUENCING

- A. Coordinate Work in this section with other trades.
- B. Coordinate with the Construction Manager the construction of support and fixings for tracks, hangers and winch assemblies, provision of sleeves for operating lines, access panels, etc.
- C. Coordinate with Division 26 provision of electrical supplies and conduit for control wiring.

## 1.7 PROJECT CONDITIONS

A. Field Measurements: Verify all critical dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

#### 1.8 SPECIAL WARRANTY

- A. Warrant systems and equipment to be free of defective components, faulty workmanship and improper adjustment for a period of two (2) years from the date of Owner's acceptance. Paint and exterior finishes are excluded relative to failure due to unusual exposure. Replace items showing evidence of defective materials or workmanship (including installation workmanship) within thirty (30) days after notification. Make replacements without cost to the Owner. Rectify conditions that might present a hazard to human life, well-being and or property within forty-eight (48) hours of notification.
- B. Designate warranties on manufactured equipment to the Owner to commence on the date of system acceptance.

#### 1.9 MAINTENANCE

#### A. Maintenance Service:

 Provide maintenance service for a period of one (1) year after final acceptance of the installation. This service consists of at least two (2) half-yearly visits to the site for checking and adjusting of equipment. Perform the first visit six (6) months after the system has been accepted. Arrange visit to be at a time mutually agreeable to the Owner.

#### B. Extra Materials:

- 1. Provide the following units as spares to be included in the base bid and turned over to the Owner at the time of system commissioning and training:
  - a. Unique test equipment for repair and maintenance of the motive and control systems
  - b. One (1) digital encoders of the type used in the systems
  - c. One (1) direct strike limit switches of the type used in the system
  - d. One (1) reed type limit or proximity switch of the type used in the system
  - e. Ten (10) track single carriers of the type used in the system
- 2. Replace extra materials that are used during the warranty period so that the complete specified inventory is available throughout the warranty period.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Provide the rigging systems from components (except where otherwise stated) that are the products of one of the following manufacturers:
  - 1. Atlas Silk Division, H&H Specialties Inc., South El Monte, CA 800-221-9995
  - 2. Automatic Devices Co. (ADC), Allentown, PA 800-360-2321
  - 3. J.R. Clancy, Inc., Syracuse, NY 800-836-1885
  - 4. ETC Rigging, Middleton, WI 608-831-4116

#### 2.2 MATERIALS

- A. Materials shall conform to the following ASTM and ANSI standard specifications:
  - 1. Structural steel shapes and plate: A36.
  - 2. Steel tube: A500.
  - 3. Malleable iron casting: A47.
  - 4. Gray iron casting: A48.

## B. Fasteners:

- 1. Comply with ANSI B18.2.1&2 Specification for square and hex bolts and nuts.
- 2. Bolts and fasteners shall be grade 5 or better.
- 3. Fasteners shall be rated for the anticipated loads.
- 4. Provide fasteners with approved markings indicating their rating.

## C. Electrical and Control Components:

- 1. Comply with the requirements of the NFPA National Electric Code.
- 2. Comply wi9th the requirements of the NFPA 79, 2012 Electrical Standard for Industrial Machinery

#### 2.3 MANUFACTURED UNITS

#### A. Sheaves:

- 1. Provide blocks with sheaves as described herein.
- 2. Provide sheaves with rope and cable grooves that conform to rope and cable manufacturers' standards for groove shape and tolerance.
- 3. Provide sheaves to operate on precision tapered roller bearings properly sized for the required load and speed. Bore the hub within the close tolerances established by manufacturers engineering data for proper press fit of the cups without need of further cup clamping devices.
- 4. Machine grooves to be smooth and free of irregularities, tool marks and imperfections. Machine hubs to assure proper bearing alignment.
- 5. Cast Sheaves: Provide from machined cast blanks for manual counterweight sets.
- 6. Steel Sheaves: Provide from machined solid steel blanks for all motorized counterweight sets.
- 7. Synthetic Sheaves: Provide for sets, other than motorized sets, from either machined extrusion or injection-molded shapes. Where applicable, machine sheave grooves and hubs according to wire rope manufacturers' recommendations.
- 8. Recognized:
  - a. ASTM A48 Class 30 gray iron
  - b. Nylatron GS, The Polymer Corporation

## B. Blocks:

- 1. Provide blocks to be suitable for anticipated loading and required mounting.
- 2. Provide blocks with the appropriate sheave as specified herein.
- 3. Configure the block so the cable is supported per wire rope manufacturer's recommendations.
- 4. Configure blocks to prevent the hoisting rope from leaving the sheave groove. Provide block design to prevent the hoisting rope from leaving the housing in event of sheave, shaft or bearing failure.
- 5. Provide shafts for sheaves of precision-machined cold finished steel sized to accommodate the sheave bearing and load. Employ a key or wire keeper pin to prevent shafts from rotating. Thread the other end of the shaft and provide with locknut.

- 6. Provide side plates (cheeks) of steel plate of a cross section required for the anticipated load, but in no instance, less than 12 gauge (0.1046 inches). Secure side plates to each other with spacer assemblies each consisting of appropriately sized bolts, nuts, washers and round tube spacers. Arrange spacer assemblies in a configuration to permit anticipated movement of rigging while restraining running lines from escaping sheave grooves. Provide spacers with appropriate tapers and finishes to prevent damage to running lines.
- 7. Weld side plates to appropriately sized base angles resulting in a rigid parallel housing for the sheave.
- 8. Align each sheave within the block so that the center and sides of the groove rotate in the same axis perpendicular to the axle and parallel to the side plates. Distance between outer face of sheave and inner face of cheek plate shall be less than one cable diameter.
- 9. Provide loft blocks with steel mounting clips extending the full width of the base angles. Provide clips with an offset to allow for mounting beam flange thickness. Rigidly position each clip with not less than two (2) appropriately sized rated bolt assembly.
- 10. Cut cheek and draw bolt mountings are not acceptable.
- 11. Head Blocks, Underhung:
  - a. Provide head blocks with 12 inch diameter sheaves.
  - b. Provide underhung head blocks with two (2) full-length steel angles or one (1) channel for attachment to the head block beams. Provide a minimum of six (6) appropriately sized bolts and locking nuts.
- 12. Loft Blocks, Underhung:
  - a. Provide loft blocks with 8 inch diameter sheaves.
  - b. Provide each underhung block with solid nylon idler sheaves with sealed ball bearings for guiding and supporting running lines at proper elevation and groove quantities related to the headblocks. Solid nylon idlers shall prevent cable from sagging, touching and wearing against other elements.

#### C. Lift Lines:

- 1. Determine the diameter and classification of wire rope construction to suit the system operational requirements. Minimum standard for overhead lifting: wire rope classification of 7 by 19 IWRC.
- 2. Employ continuous lines from the same spool/length, free of knots, splices or mechanical fasteners along their length unless specifically required otherwise in the Contract Documents. Do not employ damaged or deformed cables.

#### D. Batten Connections:

- 1. Horizontal trimming device complete with steel formed batten clamp, static lift line diverter sheave mounted to formed batten clamp and rubber pinch block as indicated in the drawings.
- 2. Provide one (1) loose pin chain shackle at lift line eye sized for load and batten clamp.

## E. Pipe Battens – fixed and motorized:

- 1. Provide pipe battens of 1-1/2 inch nominal Schedule 40 seamless black wrought steel pipe. Join batten sections with 24 inch long by 1-9/16 inch D.O.M. steel tube splice sleeve extending 12 inches into each pipe and held by two (2) 3/8 inch hex bolts and lock jam nuts on each side of the joint.
- 2. Provide pipe battens clean and free from mill finishes, scale and rust.
- 3. Provide battens in the length(s) depicted on the Drawings. Incorporate full pipe sections for each batten with only one partial section located on centerline.
- 4. Drill two (2) holes at the end of each batten to allow for securing of batten extensions as shown on the Drawings.
- 5. Appropriately number each batten on both ends as to be read from above and below. Employ white PVC snap rings 2 inches wide with indelibly inked black numerals. Provide single digit on each snap ring.
- 6. Mark battens with a painted white stripe 1inch wide running around the full circumference and at the proper lift line attachment points. Paint the end of each pipe white with a 1'-0" wide stripe from the ends toward the midpoint.

#### F. Beam Clamps and suspension points - static:

- 1. Provide two piece formed or stamped beam clamps at locations indicated in the Drawings.
- 2. Beam clamps shall engage both sides of the lower flange of the steel beam
- 3. Beam clamps shall provide a center suspension point below the beam.
- 4. Clamps shall be rated for 8x the calculated WLL.
- 5. Provide complete with self-colored proof coil chain, loose pin shackle turnbuckle and two-piece formed steel batten clamps
- 6. Finish color black

# G. Curtain Tracks – fixed:

- 1. Tracks and accessories shall be provided from one manufacturer.
- 2. Provide the tracks from heavy-duty channel type track constructed of 14 gauge steel formed to provide parallel double tracks for carrier wheels. Except for the bottom carrier slot, the track shall be totally enclosed.

- 3. Provide each track assembly from as few pieces as possible, free of burrs, dents and irregularities. Do not exceed 6'-0" on center for the maximum spacing of manufacturer's hanger supports.
- 4. Provide the House Curtain Traveler Track Assembly of sufficient length to allow the curtain to travel clear of the maximum proscenium opening.
- 5. Provide the House Curtain Traveler Track Assembly on a single factory supplied backbone with an overlap that shall be achieved at the track without the use of a secondary backbone pipe or overlap master carriers.
- 6. Provide two (2) master carriers for each double-section of track. Provide each carrier with four (4) nylon wheels fitted with ball bearings and paired so that two wheels ride in the track on either side of the carrier slot. Provide each carrier with two (2) clamps for attachment of 1/2inch operating cord and two plated swivels with a 6 inch trim chain for curtain attachment.
- 7. Provide single carriers with two (2) nylon ball bearing wheels and a "hollow center" design to bypass the 1/2 inch operating line and prevent operating line sag. Provide carriers with single plated swivels with 6 inch trim chains. Provide one (1) single carrier for each 1'-0" of track length.
- 8. Provide tracks with end stacking (rear fold, back pack) devices to prevent on-stage "bunching" and provide drapery stacking only at offstage track ends.
- 9. Provide heavy-duty type end pulley blocks with 6 inch diameter sheaves turned and grooved to fit the 1/2 inch operating cord and fitted with sealed ball bearings. Provide blocks to retain the operating cord in sheave grooves. Provide double vertical sheaves on the live end of tracks and a single horizontal sheave on the dead end.
- 10. Secure housings to the track with bolts and locking washers.
- 11. Provide end stops and operating cord supports at the overlapping track ends to positively stop master carrier movement when the curtain is closed. Secure stops to the tracks and provide with rubber bumpers to reduce "stop noise."
- 12. Provide a floor pulley block with a 6 inch diameter sheave. Slot the side plates of the floor block to permit vertical adjustment of the sheave to remove up to 14 inches of slack in the operating line. Provide block with a locking handle to permit sheave adjustment without wrenches or other tools. Incorporate vinyl sand filled base to tension the block when track is raised and lowered.
- 13. Provide hardware not specified above but required to provide a properly operating system in accordance with the intent of the Contract Documents.
- 14. Acceptable:
  - a. House Curtain Traveler Track:
    - i. Atlas Silk #200B series track (black)
    - ii. ADC #170 series track (custom black) Automatic Devices Co. (ADC), Allentown, PA 800-360-2321

- iii. Besteel #170 series track (custom black) Rosebrand, Secaucus, NJ -800-223-1624
- b. Stage Traveler Track:
  - i. Atlas Silk #200B series track (black)
  - ii. ADC #170 series track (custom black) Automatic Devices Co. (ADC), Allentown, PA 800-360-2321
  - iii. Besteel #170 series track (custom black) Rosebrand, Secaucus, NJ -800-223-1624
- c. Tab Track walk-along:
  - i. Atlas Silk #200B series track (black)
  - ii. ADC #170 series track (custom black) Automatic Devices Co. (ADC), Allentown, PA 800-360-2321
  - iii. Besteel #170 series track (custom black) Rosebrand, Secaucus, NJ -800-223-1624

# H. Motorized Rigging Systems:

- 1. General:
  - a. Provide system designed for the fixed or variable speeds as specified herein.
  - b. Verify all dimensions and mounting requirements necessary to complete the Work. Provide all secondary supporting steel work as necessary.
  - c. Brake/motor/gear unit to be from single manufacturer and to be generously sized for application.
  - d. Brakes shall be spring applied and electrically released. Brake shall apply a minimum retarding torque equal to 200 percent of motor full load torque.
  - e. Provide electric gear motors coupled to a minimum 12 inch diameter drum in a single layer or utilize a sloped drum that allows multiple layers without crushing and offsets each layer so the cables do not align
  - f. Provide motors with high inertia brake fans unless otherwise noted.
  - g. Hoist duty cycle to be a minimum of five (5) complete cycles followed by thirty (30) minutes rest.
  - h. Provide the hoist on an integrated frame, completely enclosed with appropriate drip pans and access panels for maintenance. Enclosure shall not interfere with the operation of the hoist or any other system.
  - i. Winch unit shall operate smoothly and quietly without any rattles, squeaks, or vibration apparent at any time.
  - j. All transmission couplings from motor unit through to drums to be keyed and of ample torque capacity.

- k. Transmission couplings and bearings shall be self-aligning type to address installation and field conditions.
- I. Base mounting frame to be of substantial and rigid steel construction, with suitable provision for fixing to building framing.
- m. Confirm that methods of anchoring and loads are acceptable to Project Structural Engineer.
- n. Provide and install all auxiliary mounting steel, attachments, hangers, bracing and anchors to attach Winch Unit to structure.
- o. Winch unit to be completely pre-assembled and pre-wired in factory and tested before delivery to site.
- p. Guard all moving or vulnerable parts of winch.
  - i. Provide guards of sufficient strength to withstand everyday abuse, including standing or sitting on, without damage or deformation.
  - ii. Guards shall not interfere with operation of winch unit.
  - iii. Guards shall not rattle or vibrate. Guard shall have no sharp corners or edges
  - iv. Attach guards securely, but ensure they are readily removable for maintenance purposes.
- q. Determine the diameter and classification of wire rope construction to suit the lift line operational requirements.
- r. Employ continuous lines from the same spool / length, free of knots, splices or mechanical fasteners along their length unless specifically required otherwise in the Contract Documents. Do not employ damaged or deformed cables.
- 2. General Positioning, Safety and Controls:
  - Unless otherwise noted, control and monitoring shall be accomplished with devices that are factory pre-wired and mounted on the winch base frame.
     Provide control and monitoring equipment local to the winch to ensure that it will meet the performance criteria stated herein and in Section 11 61 35 Theatrical Equipment Controls.
  - b. Provide Control devices; fixed speed motor starters, variable speed frequency drives, and vector drives, brake contactors, line contactors, and other devices as indicated. Control devices shall respond to output signals.
  - c. Provide Feedback devices; Limit Switches, Positioning devices, Brake Status, and other devices as indicated. Feedback devices shall send input signals.
  - d. Provide Alarm signals; Under Voltage, Over voltage, Over Current, Over Temperature, Phase Loss/Reversal, Cross Groove, Slack Line, Overtravel, Encoder Fault, Control Fault, and other faults as indicated. Faults shall send alarm signals.
  - e. Provide suitable junction boxes, terminal strips, and other related hardware for connection of wires to carry these signals.

- f. Control shall be via a single motor control cabinet (MCC) located as shown in the Drawings.
- g. Refer to Section 11 61 35 for Input, Output, and Alarm signals for each device. Coordinate with Section 11 61 35 the type, voltage, and state of all signals.
- h. Provide additional equipment as required to meet the intent of the contract documents. Coordinate with Section 11 61 35 Theatrical Equipment Controls for any additional signals to be sent or received by the equipment.
- Control and monitoring shall be accomplished with devices that are factory prewired and mounted on the hoist base frame. Provide control and monitoring equipment local to the hoist to ensure that it will meet the performance criteria stated herein.
  - i. Where indicated, or where specific equipment design precludes the mounting of control and/or monitoring devices to the base frame, such as direct strike limit switches, run all remote signals back to the primary control and monitoring location for each piece of equipment, such that there is one point of interface between each winch or group of winches and the performance control in system.
- j. Provide Local Controls for use in installation, service and maintenance.
  - i. Provide control operators as part of motor starter or drive cabinets mounted to base frames.
  - ii. Provide "Local"/"Remote" key switch.
  - iii. Provide deadman style pushbuttons for each direction of movement. Label each button to clearly indicate its function.

#### k. Local Mode Limit Devices:

- i. These devices shall function in both Local and Remote modes, regardless of the status of the Performance Control System.
- ii. Provide End of Travel limits for all devices. Utilize Rotary Limits unless otherwise noted.
- iii. Provide overtravel limits for all devices. Utilize Rotary Limits unless otherwise noted. Configure overtravel limits to open a line contactor in the machine's motor controller.
- iv. Where several devices are to be moved sequentially, provide enabling limits to permit motion only in the prescribed sequence and ranges.
- Rotary Limit Switches: Provide heavy-duty rotary limit switches coupled to the output shaft of the reducer. Key and pin roller chain sprockets and shaft couplings to shafts. Provide removable covers and chain guards on all limit switch assemblies.
- m. Direct Strike Limit Switches: Provide heavy-duty normally closed type limit switches securely mounted on a steel channel strut style rail for calibration and adjustment.

- n. Slack Line Detectors: Provide.
- o. Charged Bar Detectors:
  - Provide a charged bar assembly such that an incorrectly seated lift cable is detected. Provide adjustability in the detector to prevent nuisance tripping and field adjustment.
  - Provide a charged bar fitted with adjustable brackets designed to sense end of travel. Provide adjustability in the detector to prevent nuisance tripping and field adjustment.
- p. Position Transducer: Provide robust, industrial grade positioning sensor, such as an incremental positioning encoder in a sealed housing. Select an encoder easily capable of reporting to the control system with the positioning accuracy of the winch it is to be mounted.
- q. Provide motor control cabinets with safety disconnects adjacent to electric gear motors or as indicated in the Drawings.
- r. All key switches shall be unique with the option for master key enabling.
- I. Supplemental support steel and fixings:
  - 1. All stage rigging and machinery steelwork supplied and installed, including welding, drilling and all steel bolts, nuts and washers used in assembly and installation, shall be provided in accordance with the referenced standards. The steelwork may be of bolted or welded construction except where a specific construction is indicated on the drawings. The shop drawings shall show clearly the detailed construction of the steelwork, the type and size of nuts and bolts, and the size and types of welds. Site welding shall be minimized and only carried out where specifically approved by the client.
  - 2. Ensure the supplemental steelwork supporting multi-line and point hoists and all diverter and sheaves and similar are efficient and arranged so that minimum lateral forces shall be taken out to the building structure. Details of any required constraints and of the final loads on the building structure shall be formally submitted to the project structural engineer for approval prior to fabrication.
  - 3. Any stage rigging and machinery steelwork shall be designed to preclude the possibility of progressive collapse. All frames and structures shall be designed to minimize the effect, and likelihood, of welding failures. In the event of any such failure no stress in excess of the maximum permissible shall be imposed on any other member. Deflections in excess of those specified are permitted until corrective action can be taken.
  - 4. Stage equipment shall be designed with maximum deflections less than those specified or implied in Standards relating to normal building structural components. Particular members shall be designed for a lesser deflection in order to comply with the operational requirements and accurate alignment of the parts of the equipment.
  - 5. All supplemental steelwork shall be designed to withstand the effects of a Category 0 Stop (Bang Stop).

## J. Miscellaneous Loose Rigging Equipment:

## Belaying Pins:

- a. Provide belaying pins of turned Hickory or other accepted hardwood. Provide 21-inch-long pins not exceeding 1-3/16 inch diameter. Engineer the pin to withstand anticipated loading conditions. Turn the top of the pin to provide a secure hand hold and to prevent the pin from dropping through the rail.
- b. Treat the pins to prevent organic decay and to protect the surface of the wood from damage. Treatment shall in no way react chemically with the rope or the steel pinrail in a fashion that would cause damage or operational failure of elements of the Work.

# Sand Bags:

- a. Provide sand bags in the size and quantity specified herein. Fabricate from canvas and stitch to withstand intended loading. Fabricate the bags to result in a cylindrical pattern when filled; and provide with an interior flap to prevent leakage of the sand.
- b. Clearly mark, on the bag, its weight in characters at least 2 inches high. Mark bags to indicate the level of the sand required to equal the capacity of the bag.
- c. Securely sew a nylon web sling, appropriately sized for intended loading, to the bag to support the full designated weight. Pass the sling through a forged steel rigid eye safety hook, rated for the full load of the sandbag plus a 75 percent impact load.

## 3. Hauling Lines:

- a. Hauling lines shall be 5/8 inch 3-strand filament and staple/spun polyester wrapped around fibrillated polyolefin.
- b. Acceptable:
  - i. 3 STML-689, New England Ropes, Inc., Fall River, MA 508-678-8200
  - ii. Multiline II, J.R. Clancy, Inc., Syracuse, NY 315-451-3440
  - iii. MU-IINE, InterAmerica Stage, Inc., Sanford, FL 877-302-0881
- c. Color: Provide samples of all available colors.

## 4. Trim Clamps:

a. Provide grooved, five (5) line adjustable trim clamps to accept five (5) 5/8-inch diameter synthetic spot lines. Provide the clamp from two (2) parallel steel plated equipped with spring "fingers" to accept the lines and keep them in place under anticipated loading, when plates are tightened together. Employ bolts and wing nuts, arranged to ensure equal pressure on the lines, to provide plated spacing adjustment. Provide an integral eye on one plate to allow for connection of a 0.75-inch diameter purchase line.

## 5. Drapery Pocket Battens:

a. Provide typical drapery pocket battens of 3/4-inch nominal schedule 40 black steel pipes. Thread both ends of the pipe to accommodate standard 3/4-inch pipe couplings. Supply two (2) threaded couplings per pipe section.

## 6. Cyclorama Pocket Battens:

a. Provide typical cyclorama pocket battens of 1/2-inch nominal schedule 40 black steel pipes. Thread both ends of the pipe to accommodate standard 1/2-inch pipe couplings. Supply two (2) threaded couplings per pipe section.

#### 7. Batten Extensions:

- a. Provide pipe battens of 1-1/2-inch nominal Schedule 40 seamless black wrought steel pipe. Provide 24-inch-long by 1-9/16 inch D.O.M. steel tube splice sleeve extending 12 inches into batten extension and held by two (2) 3/8 inch hex bolts and lock jam nuts.
- b. Provide pipe battens clean and free from mill finishes, scale and rust.
- c. Provide batten extensions in the length(s) depicted on the Drawings and schedules.
- d. Provide welded tie rings at one end as shown on the Drawings.
- 8. Synthetic Heat Shield Borders:
  - a. Fiberglass woven fabric hemmed on four (4) sides, complete with grommets and ties.
  - b. Finish: Black.
- 9. See Schedule in the Drawings for loose equipment quantities to be provided.

#### K. Portable Pinrail:

- 1. Provide typical portable pinrail of 4 inches nominal Schedule 40 (4.5 inches OD) seamless black wrought steel pipe 5'-0" long as per drawings.
- 2. Holes through top and bottom pipe walls should be milled to accommodate belay pins 12 inches O.C.
- 3. Provide counterweight tray capable of holding sufficient standard stage weight to withstand a 250plf uplift and a 500p concentrated load.
- 4. Provide counterweight in sufficient quantities for indicated loading.
- 5. Pinrail shall have black enamel finish.
- 6. Apply signage "500 Pound Max." to pinrail.

#### 2.4 COMPONENTS

A. Clips, Wire Rope: Size forged "U"-bolt wire rope clips (Crosby clips) appropriately for the cable construction, diameter and lay of the cable with which they are employed.

- B. Compression Sleeves: Size compression sleeves appropriately for the cable construction and diameter of the cable with which they are employed.
- C. Eyebolts: Size eyebolts for the intended application. Employ dropped forged steel shoulder pattern eyebolts.
- D. Shackles: Size shackles appropriately for the intended application. Execute chain connections with chain shackles; other connections may employ anchor shackles.
  - Size the screw pin to ensure that the threads are not included in the bearing surface
    of the bolt.
- E. Thimbles, Wire Rope: Size wire rope thimbles appropriately for the cable construction and diameter of the cable with which they are employed.
- F. Thimbles, Manila/Fibrous and Synthetic Rope: Size appropriately for the rope construction and diameter of the rope with which they are employed.
- G. Turnbuckles: Size turnbuckles appropriately for the cable construction and diameter of the cable with which they are employed. Provide jaw-jaw with safety bolt clevis pin.

## 2.5 FINISHES

- A. Battens: Black.
- B. Steel Guide Track and Associated Hardware: Black
- C. Winch Motors and Frames: Gray
- D. Signage:
  - 1. Provide signage legible in construction and grammar. Sign surfaces and characters shall be textured or otherwise treated to minimize glare and veiling reflectance.
  - 2. Provide an engraved black lamacoid plaque, with white 3/8 inch characters next to the loading diagrams at stage elevation. List on the plaque the maximum load limitations for the system. Engrave a warning on the plaque cautioning against unauthorized and untrained personnel operating the rigging system.

## 2.6 SOURCE QUALITY CONTROL

A. Work on the systems may be reviewed at the point of manufacture a minimum of one time during fabrication. This review will occur during the final factory checkout prior to shipping, unless the Manufacturer and Architect agree on a more advantageous inspection date.

#### 2.7 SUPPLEMENTARY

A. Furnish equipment and hardware in addition to the items specified previously that are necessary to provide a fully working system in conformance with the intent of the Contract Documents.

## PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine drawings and confirm that number, size and location of conduit are adequate for proposed system.
- B. Inspection of components of the Work to ensure no damage has occurred during shipping or storage.
- C. Site Verifications of Conditions:
  - At earliest opportunity, the Contractor shall inspect all the spaces where theatre
    equipment components are to be installed. The Contractor shall ensure that no
    obstacles exist which might prevent proper installation, preclude the smooth
    operation of mechanisms or cause wear and tear to installed systems.
  - 2. The Contractor shall survey all relevant areas and verify dimensions. If requested, the Contractor shall make whatever modifications are deemed necessary to the theatre equipment components.
  - 3. Examine work prepared by others to receive work of this Section. Commencement of the work shall be construed as complete acceptance of preparatory work by others. The inspection includes but is not limited to:
    - a. Ensure mounting surfaces are ready to accept the Work.
    - b. Verify mounting conditions are flat, plumb, and level.

#### D. Discrepancies:

- 1. In the event of discrepancies, immediately notify the Contractor.
- 2. Do not proceed with the installation in areas of discrepancy until all such discrepancies have been fully resolved.
- 3. Commencement of Work shall indicate an acceptance of existing conditions.

### 3.2 PREPARATION

- A. Verify field measurements at the site prior to installation and modify the system accordingly.
  - 1. Deliver equipment to the site only after the building has been closed in. Coordinate storage at the site and ensure the materials and components are undamaged.

2. Protect the surrounding environment from damage by the Work.

# B. Surface Preparation:

1. Clean surfaces as necessary prior to commencing the Work.

# 3.3 ERECTION, INSTALLATION AND APPLICATION

# A. General:

- 1. Trim sets to provide horizontal track and batten set-up.
- 2. Mouse turnbuckles and shackles with a malleable wire after adjustment.
- 3. Align the center of each batten with the centerline of the proscenium opening.
- 4. Rig other loads as specified in the Contract Documents.

### B. Block Connection:

- 1. Align blocks as required by the Drawings and accompanying schedules. Conform alignment to the requirements set forth herein.
- 2. Secure blocks as per accepted mounting design. Where connection device contact is not uniform, employ steel shims. Perform mounting to insure blocks are securely attached to the support structure and are immobile except by intentional user action.
- 3. Configure underhung loft block alignment to use the idler sheaves in logical sequence.
- 4. Weld motorized set components after final alignment.

### C. Hoisting Rope Connections:

- 1. Employ rope fastenings that develop not less than 75 percent of the manufacturer's rated breaking strength of the rope employed.
- 2. Employ one continuous length of cable for each lift line. The lengthening, joining or repairing of two or more sections of wire rope is prohibited. Mid-line splices are unacceptable.
- 3. Provide compression style fittings on all line set lift lines.
- 4. Align loads on pins via steel spacing washers to assure even loading. After closing the shackle, reform the cotter pin at the end to prevent unintentional loosening of the pin.
- 5. Where permitted, make cable connections with wire rope clips according to manufacturer's application instructions.
- 6. Employ clips of the proper lay for the cable used. After initial loading, suspend a load equal to the anticipated load from the clip eye for twenty-four (24) hours, and then retighten the clips.

# D. Theatrical Drapery

1. Install Theatrical Drapery on linesets as indicated in the Drawings.

### E. Motorized Rigging Installation:

- Install all local controls including motor control/starter cabinets, limits, and positioning devices. Coordinate with Division 26 for connection to fixed disconnects and other power sources.
- 2. When the equipment is ready to receive wiring from the Performance Equipment Control System, coordinate with Section 11 61 35 Theatrical Equipment Controls and Division 26.

### F. Additional Installation

- Signage:
  - a. Install signage as described in the Contract Documents.

### 3.4 FIELD QUALITY CONTROL

### A. Inspection:

- During the installation of equipment, the Contractor shall arrange for safe access as necessary for inspection of equipment by the Architect.
- 2. Repair or replace any equipment that fails to meet with the specifications with suitable equipment prior to testing and final inspection.
- 3. At the time of these inspections, remove all temporary bracing, scaffolding, etc. to permit full operation of and access to all equipment.

### B. Testina:

- 1. Provide fourteen (14) days notice of all tests so that the Architect may witness such tests.
- 2. Clearly record the date, time, details and results of all the following tests and demonstrations and any subsequent re-tests. This will form the start of a system logbook to be handed over to the user after acceptance together with operation and maintenance manuals.

### General:

- a. Inspect the completely assembled system including all mechanisms, fittings, control panels, etc., and make good all deficiencies.
- b. Demonstrate compliance with tolerances specified in the Contract Documents.

### 4. Load Test:

- a. Submit proposal for test weight for review by Architect.
- b. Provide weights for the duration of the tests and any subsequent re-testing.

- c. Provide verification that the correct test loads are provided.
- d. Load two (2) motorized linesets with distributed weights equivalent to 110 percent specified static load.
- e. Demonstrate motion with full specified dynamic payload.
- f. Verify speed, noise and stability compliance with the Contract Documents.
- g. With each motorized lineset fully loaded for dynamic testing, perform motor current checks.
- h. Comprehensively verify the accuracy of positioning of each motorized lineset approached from both directions to each preset position.
- Provide demonstration and testing as required to obtain certification that may be required by the Authority Having Jurisdiction. This Contractor is solely responsible for obtaining such certification and all costs arising there from. Certification is a condition of final payment.

# C. Final Inspection:

- 1. Final review will be made by the Architect following written notice from the Contractor that the installation is complete.
- 2. At the time of inspection, the Contractor shall furnish sufficient workers to operate all equipment and to perform such adjustments and tests as may be required by the Architect. Repair or replace any equipment that fails to meet with the specifications with suitable equipment. The inspection shall be rescheduled under the same conditions as previously specified.
- 3. At the time of these inspections, no other work shall be performed in the auditorium and stage areas. Remove all temporary bracing, scaffolding, etc. to permit full operation of and access to all equipment.

### 3.5 CLEANING

- A. Provide clean up, including removal of packing materials, construction debris, etc., resulting from the execution of the Work.
- B. Protect surfaces or equipment provided by other sections. Clean and repair any damage to portions of the Work during the execution of the Work.
- C. Protect surfaces or equipment provided by this section. Coordinate to ensure that the Work is not damaged during subsequent installations by other trades.

### 3.6 DEMONSTRATION AND INSTRUCTION

A. Provide a total of twenty (20) hours of training to the Owner's staff on use and maintenance of this equipment after the systems have been commissioned and accepted as satisfactory. These sessions are to consist of no fewer than five (5) four-hour periods.

B. Demonstrate system operation and instruct the Owner's designated staff or representatives in the proper use, care, and maintenance of all items.

**END OF SECTION** 

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#### PART 1 - GENERAL

### 1.1 SUMMARY

A. Theatrical Equipment Controls include the human-machine interface, containment and control architecture for one unified and integrated performance system. The control system integrates into a single programmable logic control system and display of the front of house light pipes, motorized linesets and related mechanical operating devices installed in the space.

### B. Section Includes:

- 1. This section includes work in the following space:
  - a. Proscenium Theatre
- 2. Materials, components, modifications, assemblies, equipment and services as specified herein. These include, but are not limited to:
  - a. Verification of site dimensions and conditions
  - b. Submittals as required by the Contract Documents
  - c. Submission of Shop Drawings
  - d. Design and engineering of equipment and systems as required by the Contract Documents
  - e. Manufacture of equipment and systems as required by the Contract Documents
  - f. Scheduling, sequencing and coordination with other trades
  - g. Site supervision of equipment and systems installation specified herein and elsewhere in the Contract Documents
  - h. Testing and demonstration of equipment and systems as specified herein and elsewhere in the Contract Documents
  - i. Record Drawings and Operations and Maintenance Manuals (O&M)
  - j. Instruction to Owner
  - k. Furnish and install any other equipment and hardware in addition to the items specified previously that are necessary to provide a fully working system in conformance with the intent of the Contract Documents and as may be necessary to harmonize with the particular conditions found to exist on site.
- 3. Provide Systems including:
  - a. Equipment Control Panels and Graphic Displays
  - b. Portable Hand-Held Controller and Receptacles

- c. Distributed Control Panels as system design requires, in addition to Motor Control Cabinets and Nodes shown on risers.
- d. Wiring, containment and final terminations required as indicated in the Drawings,
- e. Devices, Hardware, and Software required to send command signals to motorized equipment as specified in Sections 11 61 33.
- f. Devices, Hardware, and Software required to receive feedback and alarm signals from motorized equipment as specified in Section 11 61 33.
- g. Devices, Hardware, and Software to record, label and store a preset containing positioning information of one or more pieces of motorized equipment as specified in Section 11 61 33.
- h. An integrated emergency stop system and status display for all Theatrical Equipment described herein.
- i. Define and implement the software interlocks required for the management and proper sequencing of the Theatrical Equipment described herein.
- j. Additional devices, wiring, and accessories as required to meet the intent of the Contract Documents.
- C. Products Supplied But Not Installed Under This Section
  - Power and control faceplates, back boxes and junction boxes specific to the theatrical control system.
- D. Products Installed But Not Supplied Under This Section Not used
- E. Related Sections:
  - 1. Division 11: Equipment:
    - a. Section 11 61 33: Theatrical Rigging
  - 2. Division 26: Electrical:
    - a. Section 26 00 00: General Electrical Requirements
- F. Allowances Not used
- G. Unit Prices Not used
- H. Measurement Procedures Not used
- I. Payment Procedures Not used
- J. Alternates Not used

#### 1.2 REFERENCES

- A. Underwriters Laboratories (UL)
- B. National Electrical Manufacturers Association (NEMA)
- 1.3 DEFINITIONS NOT USED
- 1.4 SYSTEM DESCRIPTION
  - A. Performance Requirements:
  - A. Hoist system and control system shall be from the same manufacturer.
    - 1. Hoist system and control system shall be from the same manufacturer.
    - 2. All materials shall be new, unused, and of the latest design.
    - 3. Theatrical Equipment Control system shall be designed to achieve the positioning accuracy of the systems controlled as specified elsewhere.
    - 4. System shall be repeatable without the use of homing procedures. Power losses to the system shall be excluded from this requirement.
    - 5. Sequenced motion of multiple devices shall be able to link together for selection as a single motion by the operator.
    - 6. Control shall be via CAT 6 network.
    - 7. E-stop shall be hardwired and may be network based with RS422 redundancy.
    - 8. Provide design compliant with ANSI E1.6-1 Powered Hoist Systems.

### B. General:

- 1. Refer to Drawings for locations of Theatrical Rigging and Front of House Light Pipe systems.
- 2. Refer to Drawings and Specifications for outline of systems design and for performance requirements of controlled systems.
- 3. Verify all dimensions and mounting requirements necessary to complete the work. Provide all secondary supporting steel work as necessary.
- 4. Any device may be selected and moved individually or in groups unless otherwise indicated.
- 5. The unified control system shall use proven technology and hardware that can be demonstrated to have worked reliably and robustly for a substantial period of time in an installation with similar quantities of devices, inputs, outputs, interlock status and positioning. Control systems of the following architectures are acceptable:
  - a. Industrial Programmable Logic Control (PLC) based system

- b. PLC with an Industrial Personal computer (PC). The PC shall be only used for the user interface, data storage and backup, while the PLC shall control motors, supervise positioning and fault conditions. The PC must use a stable real time operating system that is accepted by the industry
- c. Industrial Unix based computers such as Motorola's VME bus
- 6. Equipment Control Panels:
  - a. Equipment Control Panels shall be provided complete with all HMI devices such as touch screen displays, keyboards, keypads, status/control panels and emergency stop switch and status. It may also contain PLC processors, power supplies, data storage devices and communication devices for the motorized systems described herein.
  - b. The Equipment Control Panels shall provide a graphic display of the motorized rigging devices in a longitudinal section view based on the architectural drawings. The display shall provide numerical values in percentage for devices, fully deployed being displayed as 100 percent.
- 7. Rugged industrial grade Pendant Remote Controllers with touch screen and momentary move functions identical to those contained in the Equipment Control Panels shall be provided for the control of all systems described herein.
  - a. The centralized Emergency Stop system shall govern all mechanical equipment in the Proscenium Theatre. It ensures that any item of moving equipment can be stopped from any emergency stop button.
- 8. The contractor may propose an alternative system that is substantially equal to the control criteria and functionality as indicated in the Contract Documents, for review prior to bid by the Architect.
  - a. Control Systems utilizing PC based control structure will not be considered.
- C. Theatrical Equipment Systems controlled by this Section are provided under other sections. Refer to Section 11 61 33 for performance and design requirements for the following equipment to be monitored and controlled by this section.
  - 1. Automated Rigging Linesets
  - 2. Automated Front of House Light Pipes
  - 3. Additional devices, monitoring, and control as required to meet the intent of the Contract Documents

# D. Electrical:

 Provide electrical devices and components that are NEMA and UL approved for the applications. Wiring and electrical service shall be performed by a licensed electrician and conform to applicable codes.  All wiring in system is to be color coded and labeled without exception. Both ends of every wire and each terminal are to be numbered in accordance with wiring schematics.

#### 1.5 SUBMITTALS

- A. All submittals shall be in accordance with Division 1. All submittals shall be submitted in a timely manner, allowing sufficient time for adequate review and possible resubmittal without jeopardizing the project schedule.
- B. Product Data Not used
- C. Shop Drawings:
  - 1. Shop Drawings shall be submitted within 90 days of award of contract.
  - Drawings will show all information necessary to explain fully the design features, appearance, function, fabrication, installation and use of system components in all phases of operation.
  - 3. Fabrication, installation and erection shall not commence until Shop Drawings have been reviewed by the Theatre Consultant.
  - 4. All sheets in the Submittal shall be of the same size.
  - 5. Provide preliminary screen shots and flow diagrams of the software for review. Functional narrative may be included to elaborate on the features of the designed system.
  - 6. Submittal shall include a title sheet listing all sheets in the Submittal.

# D. Samples:

- 1. Submit samples of Equipment Control Panel faceplate indicating color, typical operator styles and labeling text style for approval by the Architect.
- E. Quality Assurance/Control Not used
  - 1. Submittals Not used
  - 2. Design Data Not used
  - Test Reports, Certificates Not used
  - 4. Manufacturers' Instructions Not used
  - 5. Manufacturers' Field Reports Not used
  - 6. Qualification Statements Not used
- F. Closeout Submittals
  - 1. Record Documents shall be submitted in accordance with Division 1.

- 2. Bind all Operations & Maintenance (O&M) documentation separate from general building sections so they can be turned over to the users after approval.
- 3. Provide draft copy of completed manuals for review to the Theatre Consultant before the start of commissioning.
- 4. Operations and Maintenance Manuals, in quantities of five (5), shall include:
  - a. Contact information for the Contractor and pertinent manufacturers
  - Safety and Operational Instructions
  - c. Complete parts and subassembly list
  - d. Equipment design parameters such as safe working loads and duty cycles
  - e. Wiring diagrams and termination schedules
  - f. Two (2) copies of computer files of any programmable logic routines and e-prom programming as applicable in a format mutually agreed with the Owner or his designated representative
  - g. Periodic Maintenance Schedule
  - h. Maintenance procedures for finishes
  - i. Certificates of compliance with applicable codes
  - j. Records of final testing and log
  - k. Spare parts list and source information
  - I. Warranty documentation
- 5. Include screen snap shots depicting all menus the system can provide.

### 1.6 QUALITY ASSURANCE

- A. Contractor: Fabricator and contractor shall be one who has been continuously engaged in the manufacturing and assembly of performance equipment control systems for at least ten (10) years. The contractor must show qualifications that include projects of similar size and scope.
- B. Installers: Skilled technicians who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and best industry practices for the proper installation of the Work.
- C. Qualifications Not used
- D. Regulatory Requirements Not used
- E. Certifications Not used
- F. Field Samples Not used

- G. Mock-ups Not used
- H. Pre-installation Meetings Not used
- 1.7 DELIVERY, STORAGE, AND HANDLING NOT USED
  - A. Packing, Shipping, Handling, and Unloading Not used
  - B. Acceptance at Site Not used
  - C. Storage and Protection Not used
  - D. Waste Management and Disposal Not used
- 1.8 PROJECT CONDITIONS NOT USED
  - A. Project Environmental Requirements Not used
  - B. Existing Conditions
    - 1. Field Measurements: Verify all critical dimensions by field measurement before fabrication and indicate measurements on Shop Drawings.

### 1.9 SEQUENCING

- A. Coordinate work in this section with other trades.
- B. Coordinate with Section 11 6133 the quantity and type of signals between local control cabinets and starters and the Theatrical Control System by this Section. It is the responsibility of this Section to coordinate this Work.
- C. Coordinate with the General Contractor the routing of conduit and the provision of sleeves, access panels, etc.
- D. Coordinate provision of electrical supplies and conduit for control wiring with Division 26.
- 1.10 SCHEDULING NOT USED
- 1.11 WARRANTY
  - A. Special Warranty
    - 1. Warrant systems and equipment to be free of defective components, faulty workmanship and improper adjustment for a period of two (2) years from the date of Owner's acceptance. Paint and exterior finishes are excluded relative to failure due to unusual exposure. Replace items showing evidence of defective materials or workmanship (including installation workmanship) within thirty (30) days after notification. Make replacements without cost to the Owner. Rectify conditions that

- might present a hazard to human life, well-being and or property within forty-eight (48) hours of notification.
- 2. Designate warranties on manufactured equipment to the Owner to commence on the date of system acceptance.

### 1.12 COMMISSIONING - NOT USED

### 1.13 MAINTENANCE

#### A. Maintenance Service:

1. Provide maintenance service for a period of one year after final acceptance of the installation. This service consists of at least two visits to the site for checking and fine tuning of equipment. The first visit shall occur approximately six (6) months and the second about twelve (12) months after the system has been accepted.

# B. Extra Materials:

- 1. Provide the following units as spares to be included in the base bid and turned over to the Owner at the time of system commissioning and training:
  - a. Unique test equipment for repair and maintenance of the control systems
  - b. One (1) electronic power supplies of the type used in the system
  - c. Five (5) additional indicator lamps of the type used in the emergency stop system
  - d. Six (6) additional fuses of each type used in the system
- 2. Replace extra materials that are used during the warranty period so that the complete specified inventory is available throughout the warranty period.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Subject to the requirements of the specifications, furnish equipment manufactured by one of the following firms or approved substitutes:
  - 1. J.R. Clancy, Inc., Syracuse, NY 800-836-1885
  - 2. TAIT/Stage Technologies, London and Las Vegas, NV 702-798-3838
  - 3. ETC Rigging, Middleton, WI 608-831-4116
- 2.2 EXISTING PRODUCTS NOT USED

#### 2.3 MATERIALS

- A. Electrical and Control Components:
  - Comply with the requirements NEC.
  - 2. Data and control signal voltage shall not exceed 50 VAC.

### 2.4 MANUFACTURED UNITS - NOT USED

### 2.5 EQUIPMENT

# A. General:

- 1. The system shall include some form of remote interface with software so that, if necessary, its operations may be monitored remotely by the manufacturer. It shall not be possible to operate the system remotely. Arrange to provide this service during normal working hours for 5 years from date of handover.
- 2. The following terms and definitions shall apply to this control section:

Term	Definition
Axis	The generic term for each multi-line or single point hoist or other driven units or equipment.
Group	The generic term for a recorded assembly of more than one axis or a combination of axes and/or pre-recorded groups.
Locked Group	A number of axes which can move together such that each axis shall always move the same distance at the same speed within axis or system parameters. Any axis getting outside speed, position or load profile window shall cause <u>all</u> axes in the group to stop. A group is therefore an assembly of axes normally suspending one or more rigidly interconnected pieces of scenery.
Free Group	In a free group, there is no interdependence between the axes. A free group is a temporary assembly of more than one axis or a combination of axes and/or groups. Generally used as a temporary assembly recorded and used within a show for ease of calling up items that are frequently to move together. In a free group, only any axis that faults will stop; others in the group continue to their destinations.
Action	The recorded motion of one or more axes and/or groups normally from one preset to another preset in a preset time subject to maximum speed at a preset speed to a recorded profile (using joystick or indented wheel)
Cue	A recorded series of one or more actions
Show	An ordered assembly of cues.

Preset/Dead	A user defined stopping or starting point for an action or cue.
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- 3. The Control System shall ensure secure, safe and reliable operation of all controlled axes within their design parameters.
- 4. The control system shall be capable of individually addressing all twelve (12) axes, or hoists and five (5) future hoists.
- 5. The Control system shall allow up to 5 axes of simultaneous movement.
- 6. Provide a full control system based on computerized programmable logic controllers (PLCs) offering the highest level of operational control function and reliability.
- 7. All components in the control systems shall be protected against a single failure which would disable the system.
- 8. The system shall include an uninterruptible power supplies (UPS) to maintain in operation all the control electronics and processing. It is not anticipated that the UPS will provide power to operate the system, just to allow the control system to shut down properly.
  - a. The system shall be maintained by a UPS for a minimum of 15 minutes. Arrange for a clear warning message to be displayed on all OCSs advising of the power failure and the remaining time before the UPS shuts down.
  - b. The inputs and outputs of the UPS shall be pluggable so that the entire UPS can be easily bypassed in the event of failure and the system run without a UPS.
  - c. Noise from the UPS units is to be included within the overall noise limits as described in the Acoustic Requirement section.
  - d. The UPS shall be capable of being remotely monitored for function and battery life over an IP based network.
- 9. The control system shall be capable of outputting show cues to a formatted document suitable for printing that includes hoist, starting position, end position speed, time and accel/deccel curve information for each cue.
- 10. The control system shall create a "show file" as a series of executable commands that repeat the fly system cues as recorded by the operator. The show file shall be stored in the system-
- 11. The system shall recognize a hoist or winch when it is connected to the system and shall prompt the operator as to the constraints for that hoist before allowing operation.
- 12. The system shall allow for the introduction of up to 2 Operator Control Stations (OCSs).

# B. Control Function Requirements:

1. Each hoist shall communicate directly back to the main controller or programmable logic control unit (PLC) via CAT 6 cabling and raceway. "Daisy-chaining" hoist control

- from hoist to hoist is not permitted, all hoist control wiring shall go back to a connector on the bus or to the control cabinet.
- 2. Controls shall include single and multiple axis selection and provide for the making and unmaking of temporary groups of hoists to move synchronously or in which different axes (hoists) can move different distances at different speeds.
- 3. Axes or groups shall be able to be moved, raised or lowered at preset or variable speeds using a joystick, indented wheel or similar approved control, and a whole group, or individual axis, trimmed to a preset ("dead") position. Operation of the joystick or wheel shall be able to be switched, or used with another control, to provide slow speed operation for position setting. Individual axes shall be able to be 'picked' to be adjusted separately, or skipped to remain stationary.
- 4. The controls shall permit the creation and recall of an action. An action shall be the movement of an axis or group to a new position in a preset (but adjustable) time or speed with a assignable acceleration and deceleration.
- 5. A cue shall consist of several actions which lead to a target position for all the controlled axes and shall be able to be recorded
- 6. Actions shall be able to be repeated and included in several cues.
- 7. System shall be able to cycle continuously between two presets or entered target positions and to accept a new target position in place of that to which it was moving at any time.
- 8. Axes travelling different distances shall move proportionally in the time set and shall recalculate whenever time is changed. If time set or remaining is too short to complete a movement, relevant axes shall travel at maximum speed and indicate a time setting error and the time required for the movement to the operator.
- 9. Overall time for an action or cue shall be able to be adjusted at any time including during any motion.
- 10. It shall be possible to skip over cues, without executing intermediate cues between the starting cue and destination cue.
- 11. The operator shall always be able to view and check all aspects of a move, action or cue before initiating motion. The operator shall be given warning of all record functions, which might overwrite previous information and shall have to take further action to carry out the recording.
- 12. All pushes or keys initiating motion, such as buttons in joysticks or GO buttons, shall be "hold to run" ("Dead Man's" Buttons).
- 13. It shall be possible to record or modify presets ("deads") for any axis or group from any authorized OCS without recourse to any other control panel or the creation or inputting of any other data.
- 14. The maximum speed of a group shall be defined by the most heavily loaded axis in motion.

- 15. The system shall be designed so that the maximum electrical power available is not exceeded by the system.
- 16. A Setback facility shall keep a record of where all axes should be at the end of each cue. If requested to set back to another cue state, the system shall present the Operator with a list of moves necessary to achieve that state. The Operator shall then be able to select which moves he wants to execute. The required moves will be ordered by relevance. The axes shall travel at an appropriate medium speed until the desired cue state is reached.
- 17. It shall be possible to return from any condition through each of these stages using the equivalent of an ESCAPE key.
- 18. Trapezoidal and S-ramp acceleration/deceleration profiles shall be provided as standard. The default system shall be S-ramps. Programmable motion profiles of an action (acceleration curve, variation in speed, deceleration curve and similar) as carried out by the operator using the joystick shall be able to be recorded as part of an action.
- 19. Motion profiles that include one or more smooth changes of direction shall be easily programmable.
- 20. It shall be possible to change from the default settings of acceleration and deceleration for a movement. Default acceleration and deceleration shall not be displayed to the operator unless requested.
- 21. The system shall accept any logical change or new instruction at any time, including during the motion of hoists, and shall process and implement the new instructions. The result shall be a smooth transition and continuing motion of the hoists at a new speed or direction, or controlled deceleration and stop. Where the new instruction requires hoists to travel at greater than maximum speed, they shall travel only at the maximum for each axis and related hoists shall travel at the correct pro-rata speed. Under these circumstances the operator shall be advised that the move is not being carried out as instructed.

# C. User Access:

- 1. The system shall require entering a unique user identification code before operation. The system shall store, as a minimum, the last ten (10) entered codes.
- 2. The system shall allow for a minimum of 4 user levels of increasing levels of access defined as follows. Submit alternate user permissions for review.

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User Level 3	Program and operate all axes. Can program and run a show
User Level 2	Program and run limited axes. Can program and run a show
User Level 1	Run a show and limited axes only

3. The System shall provide the following minimum response times:

Action	Minimum response times
Axis or group ready to move	300ms
Load cue	500ms
Record actions, cues, presets ("deads")	1 second
Load a show file	10 seconds
Operator Control Station Startup	30 seconds
Operator Control ready after log in	5 seconds

# D. Equipment Control Panels:

- 1. Provide one control panels capable of accessing all aspects of the equipment to be controlled. Control Panels by this section shall be placed where the Performance Equipment Control Panel PECP#1 is indicated on the Drawings.
- 2. Confirm dimensions and details of Equipment Control Panels and equipment provided under other sections located on the proscenium wall. Coordinate final placement of this equipment with Architect.
- 3. Equipment Control Panels shall be locking type enclosure. Labels for all control faceplate devices shall be engraved 'lamacoid' type or a silk-screened film or panel that will not degrade over time.
- 4. Panel shall conform to NEMA standards.
- 5. All status panels shall be pre-wired and attached to terminal blocks located in this panel. Correctly size and label terminal blocks.
- 6. A receptacle shall be required for the connection of the Portable Handheld Controller.
- 7. Provide all wireways, pull boxes, or junction boxes adjacent to this panel in addition to those indicated in Drawings.
- 8. All programmable logic controller data shall be recordable to non-degradable media.
- 9. All user functions, faults, emergency stop activation, user operations, safety events, and diagnostics shall be recorded with a time and date identification and accessed as part of an event log.

- 10. There shall be facility for print-out of values shown on the graphic display.
- 11. Provide modem or Ethernet connection to remote computer station for diagnostic reports and printing. Provide Report and Diagnostic software on a computer as directed by Owner (Computer not in contract).

# E. Control receptacles:

- 1. Network ports shall be clearly labeled as part of the hoist system and employ ruggedized connectors and receptacles.
  - a. Recognized:
    - i. Receptacle: Neutrik NE8FDP-B RJ45
    - Plug: Neutrik NE8MC Ethercon RJ45 Cable Housing

### F. Pendant:

- 1. Provide a hand held pendant control as indicated in the Drawings. Pendant shall be a touch screen type device for equipment selection and status. The operator shall have to press one of several physical buttons to allow movement of any machine.
- 2. Design displays to duplicate displays on the main equipment control panels.
- 3. Provide an enable switch that must be held to enable pendant usage.
- 4. Provide pendant with 30 feet of flexible cable with strain relief attached.

# G. Emergency Stop System:

- 1. Provide an emergency stop system that is a hard wired, normally closed system connecting all devices and locations to the Theatrical Equipment Control System.
- 2. Provide mushroom type illuminated switch, engraved faceplate, wiring and containment in locations adjacent to moving equipment and pendant receptacle locations. A depressed switch shall mechanically latch into place. The switch may be reset by twisting or pulling the switch.
- 3. The emergency stop system shall be a multiple wire system such that it meets the requirements described herein.
- 4. Each emergency stop station's status shall be identified and indicated at a status panel integrated into the Equipment Control Panels graphical display.
- Activating the emergency stop system shall stop and prevent further motion by all
  equipment controlled under this section and equipment in other separately controlled
  Sections.
- 6. An engaged emergency stop button shall extinguish all other stations and flash until reset.
  - a. Where HMI devices have integrated red, mechanically latching, mushroom type buttons that are not illuminated, the contractor may use the graphical display on the HMI device to fulfill this requirement.

### 2.6 CONTROL POINTS

- A. Automated Rigging Lineset Hoists
  - 1. Quantity: twelve (12)
  - 2. Inputs:
    - a. Position Quadrature encoder signal
    - b. Limit Up
    - c. Limit Down
    - d. Brake status
  - 3. Outputs:
    - a. Emergency Stop OK
    - b. Enable
    - c. Brake Pilot
    - d. Secondary Brake Pilot
    - e. Up Pilot
    - f. Down Pilot
    - g. Drive Reset Pilot
    - h. Line Contactor Reset Pilot
  - 4. Alarms:
    - a. Overcurrent
    - b. Slack Line
    - c. Overtravel Fault
    - d. Drive Fault

### 2.7 COMPONENTS

- A. Electrical Components:
  - 1. All electrical components to be of high quality, industrial grade, selected to ensure robustness, long life, high reliability and low maintenance.
  - 2. All electrical components and assemblies to be UL listed.

- 2.8 ACCESSORIES NOT USED
- 2.9 MIXES NOT USED
- 2.10 FABRICATION NOT USED
  - A. Shop Assembly Not used
  - B. Fabrication Tolerances Not used
- 2.11 FINISHES NOT USED
- 2.12 SOURCE QUALITY CONTROL
  - A. Tests and Inspection:
    - Work on the systems may be inspected at the point of manufacture a minimum of one time during fabrication. This inspection will occur during the final factory checkout prior to shipping, unless the Manufacturer and Architect agree on a more advantageous inspection date.

#### PART 3 - EXECUTION

- 3.1 INSTALLERS NOT USED
- 3.2 EXAMINATION
  - A. Site Verification of Conditions:
    - 1. Examine work prepared by others to receive work of this Section and report defects affecting installation to the General Contractor for correction. Commencement of the work shall be construed as complete acceptance of preparatory work by others. The sphere of inspection includes but is not limited to:
      - a. Ensure mounting surfaces are ready to accept the Work.
      - b. Verify mounting conditions are flat, plumb, and level.
      - Examine drawings and confirm that number, size, and location of conduit are adequate for proposed system.
      - Inspect components of the Work to ensure no damage has occurred during shipping or storage.
      - e. Examine the equipment to be controlled by this Section. It is the responsibility of this contractor to verify mechanical installation by others is complete and is ready for electrical control installation. In the event of deficiencies in the installation of the equipment to be controlled, immediately notify the Construction Manager.

# 2. Discrepancies:

- a. In the event of discrepancies, immediately notify the Construction Manager.
- b. Do not proceed with the installation in areas of discrepancy until all such discrepancies have been fully resolved.
- c. Commencement of work shall indicate an acceptance of existing conditions.

#### 3.3 PREPARATION

- A. Protection Not used
- B. Verify field measurements at the site prior to installation and modify the system accordingly.
  - 1. Deliver equipment to the site only after the building has been closed in. Coordinate storage at the site and ensure the materials and components are undamaged.
  - 2. Protect the surrounding environment from damage by the Work.

### C. Surface Preparation:

1. Clean surfaces as necessary prior to commencing the Work.

# 3.4 ERECTION, INSTALLATION AND APPLICATION

- A. Special Techniques Not used
- B. Interface with Other Work Not used
- C. Sequences of Operation Not used
- D. Site Tolerances Not used
- E. Install items plumb, straight, square and level in locations indicated on the Contract Documents and as shown on approved workshop drawings.
- F. Provide, and terminate Stage Level PECP#1 and all control devices.
- G. Install and connect logic control panels and control nodes.
- H. Install control wiring in conduit and connect to motor drives, control nodes, terminal boxes and cabinets provided and installed as specified in Section 11 61 33 and Division 26.
- I. Provide adequate protection for all materials and equipment against damage by dirt, paint, damp or physical abuse until system is accepted and handed over to users. This includes providing purpose made covers that may be temporarily removed to allow testing and commissioning work to proceed. Systems will only be accepted in 'as new' condition.

- 3.5 REPAIR/RESTORATION NOT USED
- 3.6 RE-INSTALLATION NOT USED
- 3.7 FIELD QUALITY CONTROL
  - A. Site Tests, Inspection:
    - 1. During the installation of equipment, the Contractor shall arrange for safe access as necessary for inspection of equipment by the Theatre Consultant.
    - 2. Any equipment that fails to meet with the specifications shall be repaired or replaced with suitable equipment prior to Testing and Final Inspection.
    - 3. At the time of these inspections all temporary bracing, scaffolding, etc. shall be removed to permit full operation of and access to all equipment.
    - 4. Provide fourteen (14) days' notice of all tests so that the Theatre Consultant may witness such tests.
    - 5. Clearly record the date, time, details and results of all the following tests and demonstrations and any subsequent re-tests. This will form the start of a system logbook to be handed over to the user after acceptance together with operation and maintenance manuals.
    - 6. Inspect the completely assembled system including all mechanisms, fittings, control panels, etc., and make good all deficiencies.
    - 7. Submit for approval a detailed acceptance test procedure designed to demonstrate compliance with the contractual requirements. Implement test procedure after approval is obtained.
    - 8. Provide demonstration and testing as required to obtain certification that may be required by the Authority Having Jurisdiction. This Contractor is solely responsible for obtaining such certification and all costs arising there from. Certification is a condition of final payment.
    - 9. Final review will be made by the Theatre Consultant following written notice from the Contractor that the installation is completed.
    - 10. At the time of inspection, furnish sufficient workers to operate all equipment and to perform such adjustments and tests as may be required by the Theatre Consultant. Any equipment that fails to meet with the specifications shall be repaired or replaced with suitable equipment and the inspection shall be rescheduled under the same conditions as previously specified.
    - 11. At the time of these inspections, no other work shall be performed in the auditorium and stage areas. All temporary bracing, scaffolding, etc. shall be removed to permit full operation of and access to all equipment.
  - B. Manufacturers' Field Services Not used

#### 3.8 ADJUSTING - NOT USED

### 3.9 CLEANING

- A. Provide cleanup, including removal of packing materials, construction debris, etc., resulting from the execution of the work.
- B. The Contractor shall be responsible for the protection of surfaces or equipment provided by other sections. The Contractor shall clean and/or repair any damage to portions of the work during the execution of the work.
- C. The Contractor shall be responsible for the protection of surfaces or equipment provided by this section. Coordinate to ensure that the work is not damaged during subsequent installations by other trades.

### 3.10 DEMONSTRATION

- A. Provide a total of twelve (12) hours of training to the Owner on use and maintenance of this equipment after the systems have been commissioned and accepted as satisfactory. These sessions are to consist of no fewer than three (3) four-hour periods.
- B. Demonstrate system operation and instruct the Owner or representatives in the proper use, care, and maintenance of all items.
- 3.11 PROTECTION NOT USED
- 3.12 SCHEDULES NOT USED

**END OF SECTION** 

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### PART 1 - GENERAL

# 1.1 SUMMARY

- A. This section includes the manufacture of Theatrical Draperies and accessories required for visual masking, acoustics, and decorative effects.
- B. Section Includes:
  - 1. Work in the following spaces:
    - a. Proscenium Theatre
  - 2. Systems:
    - a. House Curtain
    - b. Black Masking Legs, Side Tabs, and Borders
    - c. Black Traveler
    - d. Black Sharkstooth Scrim
    - e. White Sharkstooth Scrim
    - f. Cyclorama White Filled Sharkstooth Scrim (Leno)
    - g. Storage Hampers
    - h. Storage Bags
    - Supervision of installation of the Theatrical Drapery by the 11 61 33 Theatrical Rigging contractor
  - 3. Provision of all labor, materials, components, modifications, assemblies, equipment, and services necessary to provide the draperies as shown on the Drawings or as specified herein, including, but not limited to:
    - Verification of site dimensions and conditions
    - b. Submittals as required by the Contract Documents
    - c. Design and Shop Drawings
    - d. Manufacture of draperies and systems as required by the Contract Documents
    - e. Scheduling, sequencing, and coordination with other trades
  - 4. Furnish equipment and hardware in addition to the items specified previously that are necessary to provide a fully working system in conformance with the intent of the Contract Documents.
- C. Products Supplied But Not Installed Under This Section:
  - 1. Installation of all drapery included in this section is specified in Section 11 61 33 Theatrical Rigging.

- D. Products Installed But Not Supplied Under This Section Not used
- E. Related Sections:
  - 1. Division 1: General Requirements
  - 2. Division 11: Equipment:
    - a. Section 11 61 33: Theatrical Rigging
- F. Allowances Not used
- G. Unit Prices Not used
- H. Measurement Procedures Not used
- Payment Procedures Not used
- J. Alternates Not used

### 1.2 REFERENCES

- A. National Fire Protection Association (NFPA) Standards:
  - 1. NFPA701 Standard Methods for Fire Tests for Flame-Resistant Textiles and Films
- 1.3 DEFINITIONS
  - A. OC: on center
  - B. ID: inner diameter

### 1.4 SYSTEM DESCRIPTION

- A. Design Requirements:
  - 1. Construct drapes to present decorative and functional finishes. Construction shall reflect the standard of care, dimensional, acoustic, and aesthetic requirements specified herein and elsewhere in the Contract Documents.
  - 2. Provide drapes in colors that are exact matches to the reference colors specified. Acceptance of products is dependent upon the ability of the manufacturer to match colors to the satisfaction of the Architect.
  - 3. Provide masking drapes in fabric that exhibits no appreciable color shift to red when lit with primary blue light.
- B. Performance Requirements:
  - 1. Construct draperies to withstand and compensate for reasonable variations in environmental conditions, normal wear and tear, and regular usage.

- 2. Construct draperies so that vertical edges and pleats hang plumb without pulling or turning under.
- 3. Flameproofing: Flame-retard materials throughout to conform to NFPA 701 as well as other applicable local, state, province and federal codes.
  - Flame-retard in accordance with the recommendations of manufacturers:
     DuPont, Monsanto.
  - b. Materials submitted showing evidence of sprayed flame-retardant are unacceptable.
  - c. Employ non-hydroscopic, non-crystalline agents in the flame-retarding process.
  - d. Flame-retard fabrics by immersion for compliance with applicable codes.
  - e. Perform flame-retarding in a manner to minimize stiffness in the fabric.
  - f. Flame-retard fabrics prior to drapery fabrication.
  - g. Flame-retardant shall be valid for not less than five (5) years following the date of installation.
  - h. Provide certification of flame-retarding.

### 1.5 SUBMITTALS

A. All submittals shall be in accordance with Division 1. All submittals shall be submitted in a timely manner, allowing sufficient time for adequate review and possible re-submittal without jeopardizing the project schedule.

#### B. Product Data:

- Storage hampers.
- C. Shop Drawings: For fabrication of all draperies.
  - 1. Shop Drawings shall be submitted within ninety (90) days of award of contract.
  - 2. Drawings will show all information necessary to fully explain the design features, appearance, function, fabrication, installation, and use of system components in all phases of operation.
  - 3. Fabrication shall not commence until the Theatre Consultant has approved Shop Drawings.
  - 4. All sheets in the Submittal shall be of the same size.
  - 5. Submittal shall include a title sheet listing all sheets in the Submittal.

### D. Samples:

- 1. Manufacturer's color charts showing the full range of colors available.
- 2. Provide samples of each type of fabric in the selected colors, including samples matching Architect's sample for custom colors.

3. Provide samples of masking fabric from each dye lot to be utilized for evaluation of color shifting properties.

### E. Quality Assurance/Control - Not used

- 1. Submittals Not used
- 2. Design Data Not used
- 3. Test Reports, Certificates Not used
- 4. Manufacturers' Instructions Not used
- 5. Manufacturers' Field Reports Not used
- 6. Qualification Statements Not used

### F. Closeout Submittals

- 1. Certificates of flame-resistance for all fabrics.
- 2. Provide three (3) hard copies of all Shop Drawings, including any updates or revisions to the original submission.
- 3. Bind all Operation and Maintenance (O&M) documentation separate from general building sections so they can be turned over to the users after approval.
- 4. Provide draft copy of completed manuals for review to the Theatre Consultant before the start of commissioning.
- 5. Provide the following electronic files:
  - Shop Drawings in their native electronic files (AutoCAD or similar)
  - b. All Submittal files, including Shop Drawings, in a Portable Document File (.pdf) format

### 1.6 QUALITY ASSURANCE

#### A. Qualifications:

 Manufacturer: A firm with a minimum of fifteen (15) years' experience in the type of Work required by this section.

# B. Regulatory Requirements:

- 1. Flame-Resistance: Comply with NFPA 701 and applicable local, state, and federal codes.
  - a. Natural fiber fabrics shall be chemically treated at the mill for flame resistance using a non-hydroscopic, non-crystalline, permanent agent in an immersion process. Follow manufacturer's recommendations. Materials submitted showing evidence of sprayed flame-retardant are unacceptable. Flame-resistance shall be effective for not less than two (2) years following the date of installation.
- 2. Inherently flame-resistant (IFR) masking material drapery shall be fabricated from 100 percent Avora, complying with NFPA 701.

- C. Certifications Not used
- D. Field Samples Not used
- E. Mock-ups Not used
- F. Pre-installation Meetings Not used
- 1.7 DELIVERY, STORAGE, AND HANDLING
  - A. Packing, Shipping, Handling, and Unloading Not used
  - B. Acceptance at Site Not used
  - C. Storage and Protection:
    - 1. Store draperies in dry, humidity-controlled spaces only.
    - 2. Protect draperies individually in plastic bags or cardboards cartons. Protect additional items with suitable plastic wrap to protect from damage.
  - D. Waste Management and Disposal Not used
- 1.8 PROJECT CONDITIONS
  - A. Project Environmental Requirements Not used
  - B. Existing Conditions Not used
  - C. Field Measurements: Verify dimensions of draperies by field measurements before fabrication and indicate measurements on Shop Drawings.
- 1.9 SEQUENCING NOT USED
- 1.10 SCHEDULING NOT USED
- 1.11 WARRANTY
  - A. Special Warranty: Warrant systems and equipment to be free of defective components and faulty workmanship for a period of two (2) years from the date of acceptance. Replace items showing evidence of defective materials or workmanship within thirty (30) days after notification. Make replacements without cost to the Owner.
  - B. Designate warranties on manufactured equipment to the Owner to commence on the date of acceptance.

### 1.12 COMMISSIONING - NOT USED

### 1.13 MAINTENANCE

### A. Extra Materials:

- Furnish extra materials described below that match products provided, are packaged with protective covering for storage, and are identified with typed labels clearly describing contents.
  - a. Provide 10 percent of the total quantity of tie lines and clips.
  - b. Provide three (3) running yards of each fabric type for use as patching.
  - c. Provide container suitable for the long term storage and protection by the owner of all extra materials provided under this section. Clearly label container "Theatrical Drapery Repair Kit."
- B. Maintenance Service Not used

### PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Subject to compliance with the requirements, provide products by one of the following manufacturers:
  - 1. I. Weiss & Son, Fairview, NJ 201-402-6500
  - 2. Rose Brand, Secaucus, NJ 800-223-1624
  - 3. Stage Decoration & Supplies, Inc., Greensboro, NC 888-220-3174
  - 4. Gerriets, Ewing, NJ 609-771-8111
  - 5. Texas Scenic Company, Rockville, MD 800-292-7490
  - 6. Syracuse Scenery and Stage Lighting Co., Inc., Liverpool, NY 800-453-7775

### 2.2 EXISTING PRODUCTS - NOT USED

### 2.3 MATERIALS

- A. Fabrics: Employ fabrics of one (1) color from the same dye lot with no split widths or mismatched pieces.
- B. House Curtain 25 ounce Velour:
  - 1. Name: Charisma
  - 2. Color: Brick
  - 3. Material: 100 percent "Avora", 25-26 ounce per linear yard based on a 54 inch width.

- 4. Accepted Fabric Manufacturers:
  - a. "Prestige" KM Fabrics, Inc., Greenville, SC 800-845-1896
  - b. "Dante 8203" J.B. Martin, St-Jean-sur-Richelieu, Quebec, Canada 514-916-9003
  - c. "Lido Plus" Gerriets International, Allentown, NJ 609-771-8111

### C. House Curtain Lining:

- 1. Material: 100 percent cotton or synthetic muslin, chemically flame resistant.
- 2. Thread Count: 96 by 60.
- 3. Color: Manufacturer's standard as selected by Architect.
- 4. Accepted Fabric Manufacturers:
  - a. "PD Cloth" or "Janus" or "Lining Denim", Dazian Fabrics, New York, NY 877-232-9426
  - b. "Interlining IFR", Rose Brand, New York, NY 800-223-1624
  - c. "Ranger", Rose Brand, New York, NY
- D. Masking Drapery: Legs, Borders, Side Tabs, Flat Panels, and Traveler 22 ounce:
  - 1. Material: 100 percent "Avora", 22 ounce per linear yard based on a 64 inch width.
    - a. Color: Black.
    - b. Accepted Fabric Manufacturers:
      - i. "Encore", Milliken & Company, Spartanburg, SC 864-503-2020

### E. Sharkstooth Scrim:

- 1. Material: 100 percent cotton, chemically flame resistant, 4 ounces per linear yard based on a 30'-0" width.
- 2. Color: As per Drawings and Schedule.
- 3. Accepted Fabric Manufacturers:
  - a. Rose Brand, New York, NY 800-223-1624
- F. Cyclorama White Filled Sharkstooth Scrim (Leno):
  - 1. Material: 100 percent cotton, chemically flame resistant, 4 ounces per linear yard.
  - 2. Color: As per Drawings and Schedule.
  - 3. Accepted Fabric Manufacturers:
    - a. Rose Brand, New York, NY 800-223-1624

### 2.4 MANUFACTURED UNITS - NOT USED

### 2.5 EQUIPMENT - NOT USED

### 2.6 COMPONENTS

- A. Webbing: 3 inch wide nylon or polyester webbing.
- B. Grommets: Number 2 black metal washer grommets unless otherwise noted.
- C. Chain Weights: Zinc plated #8 jack chain sewn into muslin sleeve.
- D. Square Eye Spring Snaps: 1.75 inches long nickel-plated die cast zinc.

### 2.7 ACCESSORIES

- A. Tie Lines: Solid braided black "venetian blind" or mason cord NO 4-1/2 (9/64-inch diameter).
- B. Snap Hooks: Nickel-plated drapery-to-carrier snap fastener.
- C. Storage Bags: Heavy weight canvas bags with dust flap, double thick bottoms, and drawstring closure.

### D. Hampers:

- 1. Provide with spring steel frame with welded joints, hardwood bottom, and wear points reinforced with leather.
- 2. Provide with four (4) swivel casters with minimum 4 inch diameter rubber wheels.
- 3. Provide with heavy weight canvas duck body with riveted seams.
- 4. Provide with hinged plywood top with top mounted caster stop blocks for stacking hampers.
- 5. Provide with capacity of 24 bushels or 44 bushels, as per Drawings and Schedules.

### 2.8 MIXES - NOT USED

### 2.9 FABRICATION

- A. Shop Assembly Not used
- B. Fabrication Tolerances Not used

# C. General:

- 1. Fabric shall be inspected for weaving flaws and imperfections prior to fabrication.
- 2. Unless specified otherwise herein, sew fabrics with nylon filament thread. Employ matching thread throughout.

- 3. Unless otherwise specified, sew drapes pile up.
- 4. Construct drapery with the center of the center panel of fabric on the centerline of the drape. Legs shall be sewn with full widths only.
- 5. Fabricate drapery panels to run the height of the various sections without horizontal seams. Fabric nap or pile must run in the same direction, unless otherwise specified.
- 6. Locate grommets in the center of the webbing width so no horizontal stitching is cut or severed. Locate grommets on 1'-0" centers.
- 7. Double grommet the upper corners of each masking section so that either panel may be used stage left or stage right.
- 8. Fabricate so that the bottom edge of the face fabric and lining is within 1/4 inch parallel with the top edge of the drapery, for true hanging across full width.

### D. House Curtain:

- 1. Provide each panel to the dimensions and fullness indicated on the Schedule.
- 2. Fabricate the House Curtain from velour in two (2) lined panels to provide for bi-part action.
- 3. Box pleat at the top in the fullness listed, exclusive of turnback facing. Conceal vertical drapery seams in the box pleats. Sew pleats on the face side of the drapery and reinforce across the top with webbing.
- 4. Fabricate from black with weights as called out in this Section, with fabric nap down.
- 5. Finish bottom of the face fabric with an 8 inch stitched hem so that no machine stitching is visible on the face. The bottom of drape shall be weighted with #200 lead tape weight inserted in the hem and held clear of the bottom of the hem.
- 6. Finish bottom of drape with a light flap consisting of a double layer of face fabric sewn into bottom hem so that bottom of flap hangs 1.5 inches below bottom of finished drape.
- 7. Face back both side edges of each panel with 1/2 width of fabric. Use no machine stitching in the turnback area to prevent fabric pulling.

### 8. Lining:

- a. Line drape in the same fullness as the face fabric.
- b. Sew lining into the face curtain at the top hem.
- c. Sew shrinkage tucks into lining fabric. Shrinkage tucks shall allow for extending the length of the lining fabric by removing a row of stitching as required due to unequal stretching of fabrics. Provide two (2) 6 inch shrinkage tucks in the lining fabric. Place all shrinkage tucks within 4 feet of the bottom hem.
- d. Sew lining into the bottom hem of the face curtain.
- e. Attach sides and bottom of each panel with lengths of hook and loop tape 10 inches long located on 36 inch centers at sides and at vertical seams at bottom.
- f. Finish bottom hem of the lining 2 inches shorter than the face fabric.

- g. Provide a canvas pocket on the rear of the drape lining to accommodate the traveler idler block.
- Locate double grommets at leading edge to precisely align with traveler master carrier attachments.
- 10. Supply the drapery with loose oblong snap clips for attachment to traveler carriers.
- 11. Provide paging handle on the back side of the leading edge of each panel and at the offstage edge of each panel.
  - a. Locate the handle 42 inches AFF and secure to the turnback face material with a stitched canvas gusset.
  - b. Locate intermediate handles at several vertical seams.
  - c. Each handle shall be a unique color.
- E. Masking Legs, Tabs, Borders, Blackout and Flat Panels:
  - 1. Provide each panel finished to the dimensions indicated on the Schedule.
  - 2. Finish masking draperies without pleats, fullness, or linings.
  - 3. Fabricate from black masking material with weights as called out in this Section.
  - 4. Reinforce tops with webbing and grommets 12 inches OC and double grommets at both ends.
  - 5. Finish bottoms of masking legs, tabs and borders with a 6 inch double turned hem including a #8 canvas duck batten pocket. Seal ends of batten pocket with hook and loop tape. In addition, the bottom of drape shall be weighted with #8 chain weight inserted in the hem and held clear of the bottom of the hem.
  - 6. Finish sides of legs and tabs with a 6 inch turnback. Finish sides of borders with a 2 inch turnback.
  - 7. Secure to batten with black 36 inch NO 4 black cotton tie lines.
  - 8. Provide legs and tabs with an approved detail to permit attaching both top and bottom of the drape to a lineset batten to allow the drape to be "tripped" if desired.

### F. Two-Panel Traveler:

- 1. Fabricate the traveler from masking material in two (2) panels to provide for bi-part action. Finish each panel to the dimensions and fullness indicated on the Schedule.
- 2. Box pleat at the top in the fullness listed, exclusive of turnback facing. Conceal vertical drapery seams in the box pleats. Sew pleats on the face side of the drapery and reinforce across the top with webbing.
- 3. Fabricate from black masking material with weights as called out in this Section.
- 4. Finish the bottom of the face fabric with a 6 inch hem. The bottom of drape shall be weighted with chain weight inserted in the hem and held clear of the bottom of the hem.
- 5. Face back both side edges of each panel with a 6 inch turnback.

- 6. Reinforce tops with webbing and grommets 12 inches OC and double grommets at both ends.
- 7. Supply the drapery with snap clips for attachment to traveler carriers.
- 8. Provide traveler panels with an approved detail to permit attaching both top and bottom of the drape to a lineset batten to allow the drape to be "tripped" if desired.

# G. Scrim and Cyclorama-Leno:

- 1. Fabricate the scrim from seamless panels of sharkstooth scrim finished to the dimensions indicated in the Schedule.
- 2. Fabricate the cyclorama from panels of Leno-filled sharkstooth scrim finished to the dimensions indicated in the Schedule.
- 3. Reinforce the top with webbing. Provide zinc plated grommets 12 inches OC and double grommets at both ends.
- 4. Finish the bottom with a 4 inch hem. Include a cotton duck pocket for a ¾" nominal pipe batten, stitched to the top of the hem so as to position the batten 1 inch above the bottom of the scrim. Size pocket to allow easy insertion and removal of a bottom pipe batten of up to 1 inch nominal pipe.
- 5. Finish the sides with a 2 inch double turned hem with 3/8 inch stretcher cord inserted within. Reinforce eyelets where stretcher cord exits seam
- 6. Secure to batten with black 36 inch NO 4 black cotton tie lines.

# H. West Coast Storage Bags:

- 1. Provide heavy weight, reinforced nylon bags fabricated to "west coast" or bundle Theatre 2 legs and drops into storage on lineset battens.
  - a. With drapes in use, bag hangs flat behind drape with one long side tied to batten.
  - b. When in use to store drape, bag doubles over and is joined to batten using wraparound nylon straps with Velcro closures.
- 2. Size bags to accommodate full size of drape intended for storage. Provide bags for cyclorama, and scrim per attached schedule.
- 3. Fold under and reinforce all four edges of bags using nylon webbing double lockstitched to fabric.
- 4. Provide grommets spaced 12 inches OC across one long side of bag.
  - Secure bag to batten using black 36 inch No. 4 black cotton tie lines through grommets.
- 5. Provide 2 inch wide continuous nylon web straps spaced 12 inches OC. Size strap lengths to extend the full width of bag, wrap around pipe batten, and fold back on themselves.
  - a. Double lock-stitch continuous Velcro strips minimum of 1-1/2 inches wide along the extended end of webbing straps.

- b. One-half length of strap to have hooks and one-half to have eyes, allowing strap to wrap around drape, batten, and to secure to itself.
- c. Space nylon straps 12 inches OC, staggered to fall between tie-lines.

# I. Signage:

- Mark the centerline of the webbing with indelible marker. Use a white tie line on the centerline grommet.
- 2. Sew a white fabric label on the upper right and left corners of the webbing of the drape with the following information in the following formats. The label shall be no smaller than 3 inches by 6 inches and in no cases should the text size be smaller than 1/8 inch high.
  - a. For draperies sewn from material that is flame proofed:

ITEM NAME:			
ITEM NUMBER:			
DIMENSIONS: FULLNESS:			
DATE OF MANUFACTURE:			
DATES OF FLAMEPROOFING:////			
MANUFACTURED BY:			
THEATRE CONSULTANT: THEATRE PROJECTS CONSULTANTS			
b. For draperies sewn from inherently flame-resistant (IFR) material:			
ITEM NAME:			
ITEM NUMBER:			
DIMENSIONS: FULLNESS:			
DATE OF MANUFACTURE:			
MANUFACTURED FROM INHERENTLY FLAME-RESISTANT MATERIALS MEETING			
NFPA 701,			
MANUFACTURED BY:			
THEATRE CONSULTANT: THEATRE PROJECTS CONSULTANTS			
<ul> <li>List compliance of IFR materials with NFPA 701 and applicable local, state, and federal codes.</li> </ul>			
3. Label one bottom corner with flame-proofing information for code official.			
2.10 FINISHES – NOT USED			
A. Shop Priming – Not used			
B. Shop Finishing – Not used			

## 2.11 SOURCE QUALITY CONTROL - NOT USED

- A. Tests, Inspection Not used
- B. Verification of Performances Not used

## PART 3 - EXECUTION

## 3.1 INSTALLERS - NOT USED

#### 3.2 EXAMINATION

- A. Site Verification of Conditions:
  - 1. Examine work prepared by others to receive work of this Section.
    - Ensure mounting surfaces are ready to accept the Work.
    - b. Verify mounting conditions are flat, plumb, and level.
    - Inspect components of the Work to ensure no damage has occurred during shipping or storage.
  - 2. Discrepancies:
    - a. In the event of discrepancies, immediately notify the Theatre Consultant.
    - b. Do not proceed with the installation in areas of discrepancy until all such discrepancies have been fully resolved.
    - c. Commencement of Work shall indicate an acceptance of existing conditions of preparatory work by others.

#### 3.3 PREPARATION

- A. Protection Not used
- B. Surface Preparation:
  - Clean surfaces as necessary prior to commencing the Work.
- C. Verify field measurements at the site prior to installation and modify the system accordingly.
  - 1. Deliver equipment to the site only after the building has been closed in. Coordinate storage at the site and ensure the materials and components are undamaged.
  - 2. Protect surrounding environment from damage by the Work.
- 3.4 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION
  - A. Special Techniques Not used

- B. Interface with Other Work Not used
- C. Sequences of Operation Not used
- D. Site Tolerances
  - Supervise installation of drapery as shown on the Drawings or as directed by Theatre Consultant.
  - 2. Supervise installation and adjustment of Theatrical Drapery by the 11 61 33 Theatrical Rigging contractor.
  - 3. Supervise installation and adjustment of Theatrical Drapery by the 11 61 11 Adjustable Acoustic contractor.
  - 4. Install the complete orchestra pit scrim system in all its configurations.
  - 5. Hang additional draperies not indicated on the Contract Documents on an available batten per the direction of the Theatre Consultant for review and acceptance.
  - 6. Align the center of each border, cyclorama, scrim, and traveler with the centerline of the proscenium opening or performance area.
- 3.5 REPAIR/RESTORATION NOT USED
- 3.6 RE-INSTALLATION NOT USED
- 3.7 FIELD QUALITY CONTROL
  - A. Site Tests, Inspection:
    - 1. Provide fourteen (14) days' notice of tests so Theatre Consultant may witness such tests.
    - General:
      - a. Inspect draperies and make good deficiencies before declaring the system is complete.
      - b. Demonstrate compliance with tolerances specified in the Contract Documents.
    - 3. Initial Inspections:
      - Inspect components of the Work to ensure no damage has occurred during shipping or storage.
      - b. Drapery which fails to meet with the specifications shall be repaired or replaced with suitable drapery prior to Site Tests and Final Inspection.
      - c. Right of review by the Theatre Consultant is reserved during the course of the installation, as is access to materials at the site for eventual incorporation in the Work. Preliminary review will not be construed as eliminating the possible rejection of various components during the final inspection.
  - B. Manufacturers' Field Services Not used

## C. Reviews:

- 1. Final review will be made by the Architect following receipt in writing or notification from the Contractor that the installation is completed.
- 3.8 ADJUSTING NOT USED
- 3.9 CLEANING NOT USED

## 3.10 DEMONSTRATION

A. Demonstrate to the Architect that the drapery elements perform per the intent of the Contract Documents prior to acceptance of the drapery.

## 3.11 PROTECTION

- A. Provide protection for all materials and equipment provided by this section against damage by dirt, paint, damp, and physical abuse until system is accepted and handed over to Owner. This includes providing purpose-made covers that shall be temporarily removed to allow testing and commissioning of the system.
- B. Coordinate to insure that the Work is not damaged during subsequent installations by other trades.
- C. This Work will only be accepted in "as new" condition.

# 3.12 SCHEDULES

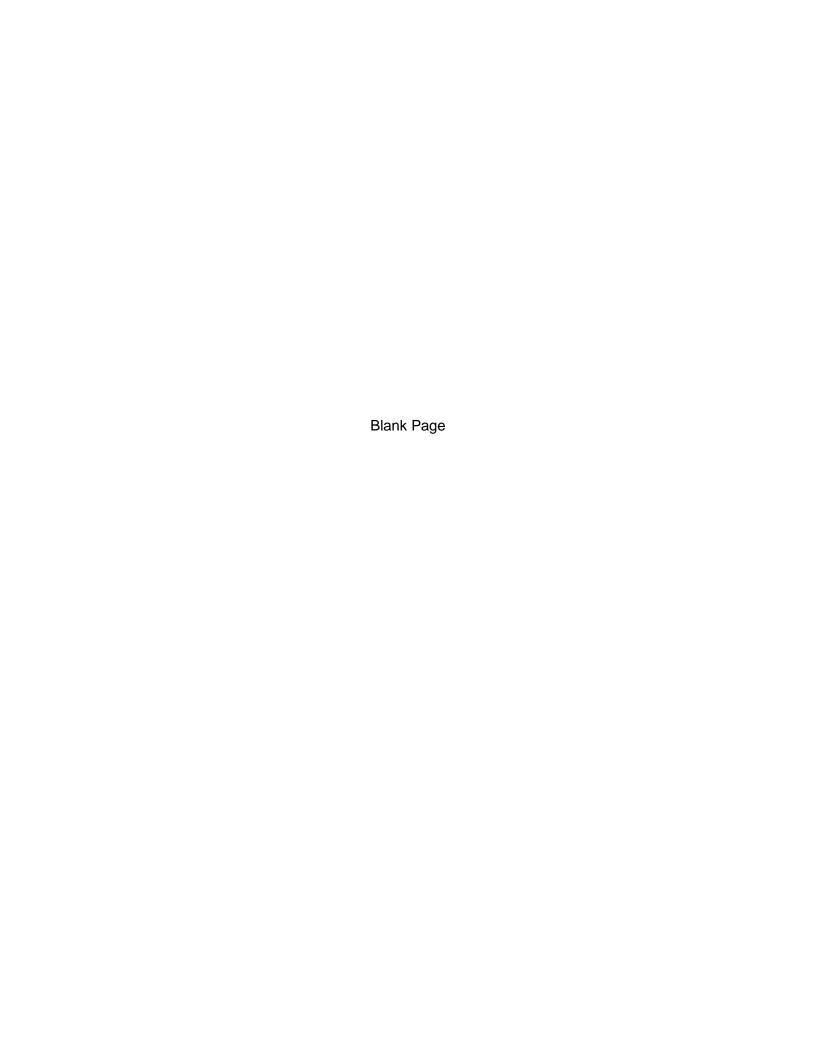
A. See Drawings.

**END OF SECTION** 

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L:\14227-NorwalkCC\14227-99-2018-06-01-Bid Set\01-Specs\11 61 43 Theatrical Draperies.docx



## PART 1 GENERAL

# 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

- A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the window shades as shown on the drawings and/or specified herein, including, but not limited to, the following:
  - 1. Manually-operated window shades.
  - 2. Electrically-operated window shades.

- 3. Field measurements of as-built conditions.
- 4. Accessories and hardware required for complete installation and operation.

#### 1.3 RELATED SECTIONS

- A. Electrical Division 26.
- B. Audio Visual Equipment for coordination of control system for shades.

#### 1.4 QUALITY ASSURANCE

- A. Provide assemblies which are complete assemblies produced by one manufacturer, including hardware, accessory items, mounting brackets, and fastenings.
- B. Provide materials in colors as selected by the Architect from manufacturer's standard colors.

# 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
  - 1. Motorized Shade Operators: Include operating instructions.
  - 2. Motors: Show nameplate data, ratings, characteristics, and mounting arrangements.
- B. Shop Drawings: Submit floor layout and elevations, indicating location of all window treatments, mechanism details, type and size of each unit, type and location of controls. Shop drawings must also show seaming of shade fabric. Submit shop drawings showing details of installation and relation to adjoining construction and conditions.
  - 1. Show coordination of control system for shades with AV control systems.
- C. Samples: Submit full size sample of each shade type for Architect's acceptance.

## D. Mock-Up

- 1. Install each type of shade assembly on one complete column bay for Architect's acceptance of installation details, workmanship and operation.
- 2. Approved mock-up shall be used as the standard for installation of work under this Section, and no further installation work shall proceed before Architect's acceptance of the mock-up.

# 1.6 WARRANTY

A. Manufacturer's standard non-depreciating 25-year limited warranty covering all hardware, chains, motors, motor control system and shade cloth.

# 1.7 DELIVERY, STORAGE AND HANDLING

A. Protect shades from damage, soiling and deterioration during transit, storage and handling to, until Owner's acceptance.

# PART 2 PRODUCTS

# 2.1 MANUALLY OPERATED SHADES

- A. Profiles and details shown on drawings are those of Silent Gliss (Basis of Design) unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are MechoShade and Lutron Systems
- B. Shade Fabric: Fabric with reflective window-side finish, Silent Gliss "Aluscreen Futura" shade cloth. Color as selected by Architect. Shade fabric shall be from the same manufacturer as the shades.
- C. Blackout Fabric: Silent Gliss "Puma". Color as selected by Architect.
- D. Provide pull chain keeper at each.
- E. Shade system shall be pre-engineered overrunning clutch design that disengages to 90% during the raising and lowering of the shade. The brake can stand a pull force of 40 lb. in the stop position. Requires no adjustment. Self-lubricating hub on to which the brake system is mounted includes an articulated brake assembly which ensures smooth, non-jerky operation in raising and lowering the shades. System shall include the following components:
  - 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
  - 2. Provide shade hardware that allows for removal and remounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
  - 3. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
  - 4. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.

- 5. Provide shade hardware system that allow for operation of multiple shade bands (multi-banded shades) by a single chain operator. Connectors shall be offset to ensure alignment from the first to the last shade band.
- 6. Provide shade hardware constructed of minimum 1/8" thick plated steel or heavier as required to support 150% of the full weight of each shade.
- 7. Drive Bracket/ Brake Assembly:
  - a. Per specified manufacturer.
  - b. Drive Chain: #10 qualified stainless steel chain rated to 90 lb.
  - c. Minimum Breaking Strength: Nickel plate chain shall not be accepted.
- F. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
  - Hem Pockets and Hem Weights: Fabric hem pocket with RF welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be the same, for all shades within one room.
  - Shade Band and Shade Roller Attachment:
    - a. Provide extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without deflection. Provide for positive mechanical engagement with drive/ brake mechanism.
    - b. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable/ replaceable with a snap-on/snap-off spline mounting, without having to remove shade roller from shade brackets.
    - c. Mounting spline shall not require use of adhesives, adhesive tapes, staples and/or rivets.

# 2.2 ELECTRICALLY-OPERATED SHADES

- A. Profiles and details shown on drawings are those of Silent Gliss (Basis of Design) unless otherwise noted. Subject to compliance with requirements specified, other acceptable manufacturers are MechoShade and Lutron Systems.
  - Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
  - 2. Provide shade hardware that allows for removal and remounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
- B. Shade Fabric: As specified above.

## C. Motorized Shade Hardware and Shade Brackets

- 1. Provide shade hardware constructed of minimum 1/8" thick plated steel, or heavier, thicker, as required to support 150% of the full weight of each shade. Plastic components without use of steel angle construction do not meet the intent of this specification and shall not be accepted.
- 2. Provide shade hardware system that allows for field adjustment of motor or replacement of any operable hardware component without requiring removal of brackets, regardless of mounting position (inside, or outside mount).
- 3. Provide shade hardware system that allows for operation of multiple shade bands offset by a maximum of 8-45 degrees from the motor axis between shade bands (4-22.5 degrees) on each side of the radial line, by a single shade motor.
  - a. Provide one shade band per window unit up to six shade band units per
  - b. All shade bands within a single motor group shall be aligned within \( \frac{1}{4} \)".

# D. Shade Motors:

- Intelligent Encoded Motor and Control System: Tubular, asynchronous (non-synchronous) motors, with built-in reversible capacitor operating at 110v AC (60 Hz), single phase, temperature Class A, thermally protected, totally enclosed, maintenance free with line voltage power supply equipped with locking disconnect plug assembly furnished with each motor.
- 2. Conceal motors inside shade roller tube.
- 3. Maximum current draw for each shade motor of 2.3 amps.
- 4. Use motors rated at the same nominal speed for all shades in the same room

# E. Intelligent Encoded Motor System:

- 1. Upper and lower stopping points (operating limits) of shade bands shall be programmed into motors via a hand held removable program module/configurator.
- Intermediate stopping positions for shades shall be a minimum of 4 predefined intermediate positions, for a total of 6 defined and aligned positions. All shades on the same switch circuit with the same opening height shall align at each intermediate stopping position.
- 3. Encoded Motors shall be addressable via a hand held removable program module and shall be capable of responding to a minimum of seven different user defined stored addresses including multiple overlapping sub groups and three reserved control input address for use by building management systems, life safety systems and other emergency inputs.

- 4. The system shall have the capability of two-way communication with the motors. Each motor shall allow for a unique address message to be received from the hand held configurator and/or a PC controller or switch.
  - a. Bus line shall consist of 2 twisted pair of 16 gauge low voltage wire.
  - b. Shade motor control components (bus interfaces, wall switches, bus supplies, auxiliary control input devices) shall be connected in series via the low voltage (12 VDC) two way digital communication bus lin.
  - c. Bus line shall be capable of being installed I a free topology to provide maximum flexibility for installation and future maintenance.
  - d. Low voltage (12VDC), digital bus line shall be powered by a bus supply transformer, requiring 115VAC (220-230 VAC) input drawing a maximum current of 1 amp. A minimum of one bus supply shall be required for every 400 linear feet of bus line. Final bus supply spacing shall be reviewed with the system manufacturer after the number of nodes per 400 ft. run of bus line has been determined.
- 5. Shade controller system shall be integrated into the AV System. Operation is by remote control system and connected to a timer for automatic adjustments related to time of year and time of day. Separate set(s) of controls for shades for use apart from those associated with the AV system shall be provided. See drawings for locations of AV main control and satellite control stations.

# 6. Wall Switches:

- a. Where noted shades shall be operated by a 4 and 8 button low voltage standard switches or programmable intelligent switches (IS). Standard switch shall be wired to a bus interface and the bus interface will be programmed to transmit an address for the local switch.
- b. Intelligent switches may be installed anywhere on the bus line. Each IS shall be capable of storing one control level address to be broadcast along the bus line.
- c. An address that is transmitted by either a switch or central controller shall be responded to by those motors with the same address in their control table.
- d. IS shall provide for interface with other low voltage input devices via a set of dry contact terminals located on the switch.
- e. Standard switch or IS may control an individual, sub-group or group of motors in accordance with the address in each motor.
- F. Shade Band: As described herein for manual shades.
- G. Finishes: Unless otherwise noted, all exposed aluminum parts have an anodized finish. Steel parts are either nickel plated, satin finish, or have been bonderized prior to painting with a baked, enamel finish.
- H. Provide tension wire sets for all shades, which extend the entire height of the shade, both sides. Wires will attach with bottom fasteners to the window mullion extension for

all full height shades. For non- full height shades, provide wall extension bracket to connect tension wires.

# 2.3 FABRICATION

- A. The shade and the fabric shall hang flat without buckling or distortion. The edge, when trimmed, shall hang straight without curling or raveling. An unguided roller shade cloth shall roll true and straight, without shifting sideways more than +/- 1/8" in either direction due to warp distortion or weave design. Shades shall fill window openings from head to sill and jamb to jamb.
- B. Provide bottom bar for all shades comparable to Silent Gliss 4903.

# PART 3 EXECUTION

# 3.1 INSPECTION

A. Examine the areas and conditions where window treatments are to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

# 3.2 INSTALLATION: GENERAL

- A. Coordinate with the work of other trades to ensure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the indicated design and the installation recommendations of the manufacturer as approved by the Architect.
- C. Upon completion of the installation, put all components through at least ten (10) complete cycles of operation, adjusting as necessary to achieve optimum operation.

# 3.3 INSTALLATION OF MANUAL ROLLER SHADES

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions and located so shade band is not closer than 2" to interior face of glass. Allow proper clearances for window operation hardware.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

## 3.4 INSTALLATION OF MOTOR-OPERATED SHADES

- A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions and located so shade band is not closer than 2" to interior face of glass. Allow proper clearances for window operation hardware.
- B. To control the responsibility for performance of motorized roller shade systems, the Contractor shall assign the engineering, and installation of motorized roller shade systems, motors, controls, and low voltage electrical control wiring specified in this Section to a single manufacturer and his authorized installer/dealer. The Architect will not produce a set of electrical drawings for the installation of control wiring for the motors, or motor controllers of the motorized roller shades. Power wiring (line voltage), shall be provided by the roller shade installer/dealer, in accordance with the requirements provided by the manufacture. Coordinate the following with the roller shade installer/dealer:
  - 1. Contractor shall provide power panels and circuits of sufficient size to accommodate roller shade manufacturer's requirements, as indicated on the mechanical and electrical drawings.
  - 2. Contractor shall coordinate with requirements of roller shade installer/dealer, before inaccessible areas are constructed.
  - Roller shade installer/dealer shall run line voltage as dedicated home runs (of sufficient quantity, in sufficient capacity as required) terminating in junction boxes in locations designated by roller shade dealer.
  - 4. Roller shade installer/dealer shall provide and run all line voltage (from the terminating points) to the motor controllers, wire all roller shade motors to the motor controllers, and provide and run low voltage control wiring from motor controllers to switch/control locations designated by the Architect. All above ceiling and concealed wiring shall be plenum rated, or installed in conduit, as required by the electrical code having jurisdiction.
  - 5. Contractor shall provide conduit with pull wire in all areas, which might not be accessible to roller shade contractor due to building design, equipment location or schedule.
- C. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- D. Clean roller shade surfaces after installation, according to manufacturers written instructions.
- E. Engage installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

# 3.5 PROTECTION AND CLEANING

A. Protect installed units to ensure proper operating condition, without damage or blemishes. Repair or replace damaged units as directed by the Architect.

**END OF SECTION** 



## PART 1 GENERAL

## 1.1 GENERAL REQUIREMENTS

#### A. LEED - GENERAL REQUIREMENTS

- 1. The Owner has made a decision that this project will reflect the values of a sustainable or 'GREEN BUILDING' as defined by the US Green Building Council's LEED Rating System Version 2009 for New Construction (NC). The Contractor is required to establish practices and procedures designed to meet the project's environmental goals as indicated in the Specifications and other Contract Documents, which are intended to contribute to the achievement of a minimum LEED Silver Rating under the LEED NC Version 2009 Program. These requirements, which may have an impact on some or all of the work of this Specification, include the following:
  - a. Implementation of a Construction Waste Management Plan (recycling).
  - b. Implementation of a Construction Indoor Air Quality Management Plan.
  - c. Use of salvaged, reusable or refurbished materials.
  - d. Use of materials which contain recycled-content.
  - e. Use of regionally manufactured materials.
  - f. Use of materials that have been regionally extracted, harvested and/or recovered.
  - g. Use of rapidly renewable materials.
  - h. Use of certified wood products.
  - i. Use of low-emitting, environmentally benign materials.
  - j. Implementation of a Construction Activity Pollution Prevention Plan.
  - k. Water and energy efficiency requirements.
  - I. Use of materials that reduce the heat island effect.
  - m. Building reuse
- 2. The Contractor is required to ensure that procedures relating to the achievement of the outlined goals, as defined in this Specification and related Contract Documents, are implemented throughout all phases of the work.
- B. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

# 1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the entrance floor grilles and frames as shown on the drawings and specified herein.

# 1.3 RELATED SECTIONS

A. Concrete recess - Section 033000.

## 1.4 QUALITY ASSURANCE

A. Manufacturer: Except as otherwise indicated, provide entrance grilles and accessories by a single manufacturer for entire project.

# 1.5 SUBMITTALS

- A. Product Data: Submit manufacture's specifications and installation instructions for entrance grille. Include methods of installation for each type of substrate.
- B. Samples: Submit samples for each type and color of exposed entrance grille, frame and accessory required. Provide 12" square samples of grille, including frame.
- C. Maintenance Data: Submit manufacturer's printed instructions for cleaning, drying, maintaining and rehandling of removable entrance grille units.

## 1.6 PRODUCT HANDLING

- A. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation, and to protect the installed work and materials of all other trades.
- B. Replacements: In the event of damage, immediately make all repairs and replacements necessary.

# PART 2 PRODUCTS

# 2.1 MAT ASSEMBLY

- A. Furnish and install "ENTEC 38" 3/8" stainless steel grating with carpet inserts manufactured by Kadee Industries; subject to compliance with requirements, Construction Specialties, Nystrom or Hendrick Achitectural.
- B. Tread Material: Type 304 stainless steel, 0.090" x 0.138" surface wires spaced with a 0.130" slot opening and resistance welded to 0.281" dia. Type 304 stainless steel support rods spaced 2" on center and 1-3/8" wide x 0.036" formed Type 304 stainless steel tread insert channels spaced 4" on center.
  - 1. Tread Inserts: Provide heavy-duty carpet inserts every 4" on center.
- C. Framing: Type 304 stainless steel with unit construction to support 300 pounds per sq. ft.
- D. Accessories: Provide hidden locking devices to prevent warping and rattling. Furnish number of lock downs as recommended by manufacturer.

## PART 3 EXECUTION

## 3.1 INSPECTION

A. Examine the areas and conditions where entrance floor grilles are to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

# 3.2 INSTALLATION

- A. Install grille frames integrally with principal pour of concrete floor system. Locate, align and level frame members accurately.
- B. Protection: Upon completion of frame installations and concrete work, provide temporary filler of plywood or fiberboard in grille recesses, and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and project reaches substantial completion.
- C. Delay installation of entrance floor grilles until work on the project reaches substantial completion.
- D. Install entrance floor grille in frame and anchor with hidden lock downs.

**END OF SECTION** 



## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplemental General Conditions, Special Conditions, and Division 1 Specification Sections, apply to this Section.

## 1.2 SUMMARY

## A. Section Includes:

- 1. Fabrication and installation of new floor mounted fixed auditorium seating in the following spaces:
  - a. Proscenium Theatre see drawings for quantities.
- 2. Accessories and spare parts
- Materials, components, and services necessary to provide the work indicated or implied in this Section and as specified herein, in the Contract Drawings and shown on related Drawings.
  - a. Verify dimensions and conditions at the job site.
  - b. Design to withstand stresses which may be anticipated during shipping, installation and constant use.
  - c. Submit Shop Drawings and documents as specified herein prior to fabrication.
- 4. Preparation and submission of sample chairs as indicated herein for review by the Architect, Theatre Consultant and the Acoustics Consultant
- 5. All transportation, delivery, and removal of all related packaging and debris from the job site
- 6. Installation in accordance with these specifications, pertinent drawings, established trade practice and applicable code requirements
- 7. Inspection, demonstration and necessary adjustment of completed installations
- 8. Submission of required record drawings, service data and certificates
- 9. Coordination with other affected work and contractors including HVAC air supply grills
- 10. Chair mounted aisle lights to be connected by the Electrical Contractor (Division 26).
- 11. Compliance with Americans with Disabilities Act Rules and Regulations

## B. Related Sections:

1. Division 11: Equipment

2. Division 15: Mechanical

3. Division 26: Electrical

## C. Alternates:

- 1. Submit all products to be considered as alternates at least seven (7) days prior to bid closing.
- 2. Acceptance of alternates is at the sole discretion of the Architect and Theatre Consultant.

#### 1.3 REFERENCES

- 1. ASTM F 851 87 (Re-approved 2005) Standard Test Method for Self-Rising Seat Mechanisms.
- California Technical Bulletin 117-2013 –Test Procedure and Apparatus for Testing Flame Retardance of Resilient Filling Materials Used in Upholstered Furniture. The requirements of this test can be met without the use of fire retardant chemicals. The use of fire retardant chemicals on this project must be approved by the Architect.

#### 1.4 SYSTEM DESCRIPTION

- A. Auditorium Seating System:
  - 1. Fixed auditorium seats: see Drawings.
  - 2. Signage and accessories: see Drawings.
  - 3. Aisle lighting: see Drawings.
  - 4. Spare parts:
    - a. Seat bottom assemblies: 2 percent of each width for each theatre and hall.
    - b. Seat back assemblies: 2 percent of each width for each theatre and hall.
    - c. All other seat parts: 1.5 percent of all parts for each theatre and hall.
    - d. Paint of each color used: three (3) one pint cans each color.

#### 5. Fabric:

- Include supply and install of fabric for all fixed seating in this contract and supply of fabric for the following:
  - i. Fabric for all fixed seating.
  - ii. Provide 5 linear yards of fabric for Attic Stock.
- b. All fabric will be from same dye lots as used in this Section.
- c. Include all shipping and handling costs as part of this Section.

- B. Fabricate, assemble and install the Work in accordance with the Contract Documents, Equipment Manufacturer's Recommendations, Applicable Construction Codes, and Approved Shop Drawings.
  - 1. The Work includes:
    - a. Modifications to Work of this Section to accommodate work of other Sections
    - b. All transportation, delivery, and removal of all related packaging and debris
    - c. Inspection, alignment, final adjustment and demonstration of completed installation

# 1.5 SUBMITTALS

- A. Submit items indicated below for design review.
  - 1. Product Data:
    - a. Submit complete manufacturer's Product Data for all work in this Section, consisting of complete product description and Specifications, catalog cuts, laboratory test results, installation instructions, maintenance instructions, and other test data required for product approval and use.
  - 2. Seat Quality Control Sample:
    - a. Seat Sample Drawings:
      - i. Provide Shop Drawings (1 inch = 1'-0" scale) for the seat quality control sample before fabrication. Shop Drawings shall be revised and resubmitted as required.
      - ii. Fabrication of sample seats shall not commence until the Theatre Consultant and the Architect determine that the seat sample drawings are in compliance with the design intent of the Contract Documents.
      - iii. Seat sample drawings shall be submitted within ninety (90) days of award of Contract.
    - b. Seat Quality Control Samples:
      - i. Prior to production of seating, submit one (1) assembled seat for each theatre and hall.
      - ii. Seat samples will have an aisle end panel on the right side as sitting in the seat and intermediate standard on the left side.
      - iii. Seat samples will have a wired aisle light and lamps, transformer if required, and male connector for 120v AC.
      - iv. Provide a sample of a designated aisle end panel separate from the seat sample.
      - v. Samples must be approved by the Architect and Theatre Consultant before final production can begin.

# 3. Seating Layout Shop Drawings:

- a. Submit seating layout Shop Drawings shall be submitted within ninety (90) days of approval of seat quality control samples.
- b. Prepare Seating Layout Shop Drawings from Contract Drawings and field measurements, indicating layout of seating units, chair sizes and aisle widths. These drawings are to be at a minimum 1/4 inch per foot scale. Provide side elevations showing profile dimensions of seating and aisle end panel. Provide sections through the centerline of the seat showing row to row depth, row access clearance dimensions, clearance of risers and mounting details for floor and riser mounted chairs. Show method of installation and anchorage. These detail drawings are to be 1 inch per foot scale. Shop Drawings shall be revised and resubmitted as required.
- c. Provide drawings showing all information necessary to explain fully the design features, appearance, function, fabrication, installation and use of system in all phases of operation. Include plan of demountable base shown in the context of a fixed seat mounted to it.
- d. Provide details of ADA compliant designated aisle end panel seats.
- e. Provide details of aisle lighting connections for designated aisle end seats.

  Provide light illumination diagram showing light levels produced by aisle lights.
- f. Provide location plans for aisle light stub-ups.
- g. Provide field measurements and survey information.
- h. Submit Shop Drawing sheets of uniform size with title sheet listing all sheets in the Submittal.

## 4. Samples:

- a. Submit a sample of aisle row and seat number plates.
- b. Submit 8 inch square minimum wood of each wood species and finish specified.
- Submit 8 inch square sample of each fabric type.
- Contract and Closeout Submittals:
  - a. Project Record Documents
  - b. Operations and Maintenance Data
  - c. Warranty documentation
  - d. Bind all Operation and Maintenance (O&M) documentation separate from general building sections so they can be turned over to the users after approval.
  - e. Provide draft copy of completed manuals for review to the Theatre Consultant before the start of commissioning.
  - f. Provide copies of all documents in electronic format.

# 1.6 QUALITY ASSURANCE

- A. The Contractor and all subcontractors shall have been an authorized representative of the manufacturer of the specified equipment and systems for a minimum of five (5) years. The Architect will be the final judge of suitability of experience.
- B. The Architect will have the right to inspect any previous equipment or systems as furnished or installed by this Contractor. In addition, the right is reserved by the Architect to reject a Contractor who has failed in any respect to comply with all provisions of any previous contract.
- C. Identify all Subcontractors included as part of the bid.

# 1.7 DELIVERY, STORAGE, AND HANDLING

- A. All equipment and material will be appropriately packed for shipment.
- B. Store equipment and materials inside and away from damp surfaces and keep material dry at all times.

# 1.8 PROJECT CONDITIONS

- A. Verify conditions at job site. All additions or corrections are to be requested prior to fabrication.
- B. Field measurements will be taken by the chair manufacturer prior to preparation of shop drawings to ensure proper fitting of work. Allow for adjustments as necessary when taking field measurements.

## 1.9 SEQUENCING AND SCHEDULING

- A. Schedule and sequence the Work in conjunction with the Construction Manager and trades performing related work. Accommodate project time schedule.
- B. Coordinate seating layouts with air diffusers prior to seat manufacture and installation. Coordinate with General and Mechanical Contractors.

#### 1.10 WARRANTY

A. Warrant the work to be free of defective components, workmanship or improper adjustment for a period of five (5) years from the date of Owner's acceptance. Replace or repair defective Work within thirty (30) days of notification. Rectify conditions that might present a hazard to human safety and or property within forty-eight (48) hours of notification. Make corrections without cost to Owner.

# PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

# A. Basis of Design:

1. Series Seating - Model: Idea

# B. Suppliers

1. Series International - Model: Idea

Contact: Thomas Boyd, Phone: 800-729-1190

Email: tboyd@seriesinternational.com

2. Ducharme Seating International - Model: Based on Symphony, to match "Idea"

Contact: Isabelle Duplantie, Phone: 514-704-41358,

Email: iduplantie@ducharmeseating.com

3. Figueras – Model: Based on Scala, to match "Idea"

Contact: Gary Tomai, Phone: 469-223-5655

Email: gtomai@figueras-usa.com

#### 2.2 MATERIALS

- A. Employ materials that are new and undamaged.
- B. Rolled steel plate, Shapes and Bars: Domestic Steel ASTM A-36-74 or current approved ASTM standard.
- C. Cast Iron: Gray cast iron conforming to ASTM 48-48 Class 25 (25,000 psi) or current approved standard, free of blow holes and hot checks. Grind parting lines and surfaces smooth.

# D. Wood:

- 1. Grading: Clear and selected for color.
- 2. No radial cut veneers will be allowed.
- 3. The clear specification of vertical plain sawn or quarter sawn hardwood veneer flitch is subject to approval of sample veneers.

# E. Plywood:

1. All hardwood veneers with solid core, 7-ply minimum, with exposed face veneers as specified.

# F. Padding Material:

- 1. Seat and Back: New, prime manufacturer medium or high density open cell polyurethane form.
- 2. Testing:
  - a. California Technical Bulletin 117 -2013.

# G. Upholstery Fabric:

- Testing:
  - a. California Technical Bulletin 117 –2013.
  - b. Wear resistance test ASTM D 4157-02 to meet or exceed 50,000 rubs with #10 cotton duck (Wyzenbeek apparatus).

# H. Chair Back Construction:

- Inner Panel:
  - a. Construct upholstered inner panel of minimum 5/8 inch thick 7-ply curved plywood to develop 2 inch minimum camber.
  - b. Glue polyurethane foam pad to inner panel. Taper foam to provide lumbar support as required for seat model.
  - c. Foam thickness to match profile of seat as shown on drawings.
  - d. Stretch fabric over pad forming smooth curves at edges.

# 2. Exposed Rear Panel:

- a. Form outer exposed rear panel with profiled shape as shown on the Drawings of minimum 5/8 inch 7-ply plywood curved to matching radius with the inner panel.
- b. Form panel with outer veneer as shown on the Drawings.
- c. Fasten outer panel to inner panel using concealed fasteners and with no voids between the inner and outer panels.
- d. Finish all veneers and solid woods to match approved samples.

# I. Chair Seat Construction:

- 1. Inner Panel:
  - a. Construct upholstered inner panel of minimum 1/2 inch thick 7-ply curved plywood to create 1 inch minimum camber at seat bottom.
  - b. Glue polyurethane foam pad to inner panel
  - c. Foam thickness to match profile as shown on drawings.
  - d. Stretch fabric over pad forming smooth curves at edges.
  - e. Bolt pivot mounting plates to inner panel.

# 2. Exposed Bottom Panel:

- a. Form outer exposed rear panel with profiled shape as shown on the Drawings of minimum 5/8 inch 7-ply plywood curved to matching radius with the inner panel.
- b. Form panel with outer veneer as shown on the Drawings.
- c. Fasten outer panel to inner panel using concealed fasteners and with no voids between the inner and outer panels.
- d. Finish all veneers and solid woods to match approved samples.

## J. Chair Standard:

- 1. Standards will be welded of minimum 14 gauge steel 1 inch x 3 inch with brackets for seat support an integral part of the standards and providing sturdy and solid support for the seat.
- 2. A steel formed foot will be welded to the bottom of the standard to provide solid mounting of the chair and withstand severe tightening and shock without fracture. The standard will be fabricated to be compatible with the floor incline and maintain proper seat and back angle and height.
- 3. Provide seat mounting hardware for standard.

# K. Chair Operation:

1. The seat bottoms shall be self-rising to the full-fold position when unoccupied at all times without adjustment. The self-rising mechanism shall be either counterweight or spring type. Down stops shall be cushioned.

# 2. Testing:

- a. ASTM F 851 87 (Re-approved 2005) Standard Test Method for Self-Rising Seat Mechanisms.
- 3. The action of the seat bottom shall be essentially silent with the sound level not exceeding 30 db when measured 3 feet from the seat with a precision sound level.
- 4. The seats shall be essentially silent when occupied with no creaking or squeaking from user movement.

# 2.3 ACCESSORIES

## A. Aisle Lights:

- 1. Provide LED aisle lights within seats where indicated on plans.
- 2. Light to be within underside of armrest.
- 3. Aisle lights to provide a minimum of 0.2 footcandles (or local code minimum but not less than 0.2 footcandles) of illumination at floor level adjacent to aisle standards within a 36 inch radius from the light fixture.

- 4. Lights to be warm in color with a color temperature of the LED within 2700 and 3100 degrees Kelvin.
- 5. Coordinate Color Rendering Index (CRI) for aisle light with other lighting adjacent to seating aisle lights. Provide lights with a CRI of at least 90.
- 6. Lights to be low voltage, 12 or 24 volts direct current.
- 7. Provide transformers, engines and/or drivers appropriate for light fixture.

  Transformers for aisle lights will be suitably housed in a steel safety enclosure and equipped with secondary fuses.
- 8. Provide dimmers for lights so that light levels can be adjusted at installation with an integrated potentiometer to 10% without flicker. Lights will only be adjusted at installation and then set.
- 9. Transformers and dimmers will be in a remote location as shown on the Electrical drawings.
- 10. Pre-wire aisle lights with 18 inch leads from aisle end standards. Wiring to aisle lights to be neatly routed within chair to light fixture.
- 11. Provide low voltage modular disconnect between light fixture and wiring harness to enable easy replacement.
- 12. All electrical components will be UL approved.
- 13. Design lighting wire harness to operate with all ADA designated aisle seat locations.
- 14. Wiring connections from the electrical distribution system to the end standards, as well as installation and connection of transformers/engines/drivers and dimmers will be by the Electrical Contractor.

## B. ADA Designated Aisle Seats:

1. Provide ADA compliant designated aisle end arms at locations shown on the Drawings.

## C. Armrests:

- 1. Solid hardwood with all edges rounded, with two keyhole slots in the bottom to lock securely to dovetail slots provided on standard and fixed with one (1) security screw.
- 2. Armrest to be solid hardwood stained to match seat backs and bottoms, with a furniture grade clear finish.

# D. Signage:

 Provide seat number, row letter, ADA designation and donor plates for seats as shown on the Drawings. Provide a numbering system for identification of all chairs. Seat numbers and donor plates will be mounted with exposed fasteners. ADA designation and row numbers will be recessed with hidden fasteners or mounted with adhesive. Provide all plates with brushed 'silver' finish.

- 2. Develop numbering system coordinated with Owner's requirements.
- 3. Coordinate graphic letter style with Owner's Graphic Consultant.

## 2.4 FABRICATION

- A. Work shall be performed by an experienced fabricator or manufacturer and installed by experienced tradesmen in accordance with the Contract Drawings, reviewed Shop Drawings and best practices of the industry, using clean, new materials. Fabricate and install all work in a neat and accurate fashion.
- B. Chair profile must fit within rows indicated on the Drawings.
- C. Make connections with tight flush joints capable of developing the full strength of the members.
- D. Provide smooth, continuous welds free of splatter and surface irregularities.
- E. Drill or cleanly punch holes; do not burn.
- F. Metal parts will be finished in manufacturer's powder coat baked high quality finish of approved color chosen by the Architect.
- G. All assembly hardware will be rust resistant, black plated, except for exposed fasteners which will match adjacent steel color.
- H. All exposed wood parts will be stained to color selected by the architect and coated with lacquer of sufficient depth to afford wear resistance of institutional quality.

# 2.5 FINISHES

- A. Proscenium Theatre:
  - 1. Fabric:

a. Manufacturer: Protela

b. Ref: W 12424 T

c. Style: Pana Nevadad. Color: Red M2141

Wood:

a. Species: Maple or Couma wood veneer

b. Finish: Black stain, with clear furniture grade finish.

c. Color: Match Architect's approved sample.

## 3. Metal Parts:

a. Paint all parts black.

## PART 3 - EXECUTION

## 3.1 EXAMINATION

## A. Verification of Conditions:

- 1. Examine Work prepared by others to receive the Work of the Section. Report defects affecting installation to the Construction Manager for correction. Notify the Architect of deviations from the Contract Documents and their relationship to this Work and all other site conditions affecting the installation of the Work and the quality of the final installation. The inspection includes but is not limited to:
  - a. Ensure that mounting surfaces are ready to accept the Work.
  - b. Verify surface conditions that may affect the quality of the installation are acceptable.
- 2. Pre-Installation Meeting
  - a. Arrange an on-site meeting with the Seating Installation Contractor, Architect, and Theatre Consultants to review installation layout and methods.

#### 3.2 PREPARATION

- A. Protect the surrounding environment from damage by the Work.
- B. Verify field measurements at the site prior to installation. Modify the system accordingly.
- C. Coordinate delivery of equipment to the site and storage at the site with the Construction Manager to ensure the materials and components are undamaged.
- 3.3 ERECTION, INSTALLATION, AND APPLICATION, CONSTRUCTION
  - A. Install the system with care that the components are straight, plumb, and aligned throughout. Provide all shims and modifications necessary.
  - B. Perform the Work in conformance with the best trade practices. Coordinate the Work with trades doing adjoining work.
  - C. Leave related work areas "broom clean" at the completion of the Work. Remove all debris created by this Work from the site.
  - D. Fasten chair mount plates with a minimum of two (2) fasteners suited to the specific mounting conditions. Design removable fasteners to leave a flush surface when chair is removed. All connections should be designed to withstand constant use.

E. Install chairs to fit within rows indicated on the Drawings, maintaining aisle ways and row clearances as indicated on the Drawings and as required by applicable codes.

## 3.4 FIELD QUALITY CONTROL

A. Final inspection shall be made by the Architect and the Theater Consultant when the installation is complete. If inspection reveals and detail of construction, fabrication, or installation not in strict accord with the Contract requirements, approval shall be withheld and Contractor shall be given ten (10) days to replace rejected items with those conforming to the specification requirements. Previous inspections do not eliminate the possibility of rejection during final inspection.

# 3.5 ADJUSTING, CLEANING, DEMONSTRATION

- A. Make adjustments, clean chairs, and demonstrate operation of seating system at final inspection.
- B. Provide training session to Owner's representative on operation, cleaning and maintenance of seats. Handover maintenance manual and warranty information.

#### 3.6 PROTECTION

A. Following installation, protect the seating from damage with appropriate covers to be removed on final acceptance.

**END OF SECTION** 

THEATRE PROJECTS CONSULTANTS, INC.

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## **SECTION 12 93 00**

## SITE FURNISHINGS

## PART 1 - GENERAL

## 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

# 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Tables.
  - Chairs.
  - Bollards.
  - 4. Tree Grate.
- B. Related Sections include the following:
  - 1. Division 2 Section "Earthwork" for excavation for installation of concrete footings.
  - 2. Division 3 Section "Cast-in-Place Concrete" for formed voids in concrete footings.

#### 1.3 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: For each type of product indicated.
- C. Samples for Initial Selection: For units with factory-applied color finishes.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Size: Not less than 6-inch- (152-mm-) long linear components and 4-inch- (102-mm-) square sheet components.
  - 2. Full Size: Table, Bicycle rack, Trash receptacle, and Ash receptacle.
- E. Product Schedule: For site furnishings. Use same designations indicated on Drawings.
- F. Material Certificates: For site furnishings, signed by manufacturers.

- 1. Wood Preservative Treatment: Include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
- 2. Sustainably Harvested Wood: Include certification by manufacturer and from sources that participate in sustained yield programs.
- 3. Recycled plastic.
- G. Maintenance Data: For site furnishings to include in maintenance manuals.

# 1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of site furnishing(s) through one source from a single manufacturer.

## PART 2 - PRODUCTS

# 2.1 MATERIALS

- A. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated; free of surface blemishes and complying with the following:
  - 1. Rolled or Cold-Finished Bars, Rods, and Wire: ASTM B 211 (ASTM B 211M).
  - 2. Extruded Bars, Rods, Wire, Profiles, and Tubes: ASTM B 221 (ASTM B 221M).
  - 3. Structural Pipe and Tube: ASTM B 429.
  - 4. Sheet and Plate: ASTM B 209 (ASTM B 209M).
  - 5. Castings: ASTM B 26/B 26M.
- B. Steel and Iron: Free of surface blemishes and complying with the following:
  - 1. Plates, Shapes, and Bars: ASTM A 36/A 36M.
  - 2. Steel Pipe: Standard-weight steel pipe complying with ASTM A 53, or electric-resistance-welded pipe complying with ASTM A 135.
  - 3. Tubing: Cold-formed steel tubing complying with ASTM A 500.
  - 4. Mechanical Tubing: Cold-rolled, electric-resistance-welded carbon or alloy steel tubing complying with ASTM A 513, or steel tubing fabricated from steel complying with ASTM A 1011/A 1011M and complying with dimensional tolerances in ASTM A 500; zinc coated internally and externally.
  - 5. Sheet: Commercial steel sheet complying with ASTM A 1011/A 1011M.
  - 6. Perforated Metal: From steel sheet not less than 0.0897-inch (2.3-mm) nominal thickness; manufacturer's standard perforation pattern.
  - 7. Expanded Metal: Carbon-steel sheets, deburred after expansion, and complying with ASTM F 1267.
  - 8. Malleable-Iron Castings: ASTM A 47/A 47M, grade as recommended by fabricator for type of use intended.

- 9. Gray-Iron Castings: ASTM A 48/A 48M, Class 200.
- C. Stainless Steel: Free of surface blemishes and complying with the following:
  - 1. Sheet, Strip, Plate, and Flat Bars: ASTM A 666.
  - 2. Pipe: Schedule 40 steel pipe complying with ASTM A 312/A 312M.
  - 3. Tubing: ASTM A 554.
- D. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107; recommended in writing by manufacturer, for exterior applications.
- E. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound; resistant to erosion from water exposure without needing protection by a sealer or waterproof coating; recommended in writing by manufacturer, for exterior applications.
- F. Galvanizing: Where indicated for steel and iron components, provide the following protective zinc coating applied to components after fabrication:
  - Zinc-Coated Tubing: External, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. (0.27 kg/sq. m) of zinc after welding, a chromate conversion coating, and a clear, polymer film. Internal, same as external or consisting of 81 percent zinc pigmented coating, not less than 0.3 mil (0.0076 mm) thick.
  - 2. Hot-Dip Galvanizing: According to ASTM A 123/A 123M, ASTM A 153/A 153M, or ASTM A 924/A 924M.
- G. Finish: Metal products shall be undercoated with a rustproofing product and finished with a polyester powdercoat. This must be an environmentally friendly metal finishing process that does not contain heavy metals (lead-free), is free of hazardous air pollutants (HAPS-free), does not generate hazardous waste and contains less than 1% Volatile Organic Compounds (VOCs). Powdercoating application process shall minimize overspray, to create less waste powder.

## 2.2 TABLES

- A. Products: Contractor Furnished / Contractor Installed. Subject to compliance with requirements, provide the following:
- B. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings LandscapeForms Windmark Table or a comparable product by one of the following:
  - 1. Anova (Tuscany Series).
  - 2. Forms+Surfaces (Avivo Table & Chairs).

C. Manufacturer:

Landscape Forms, Inc 431 Lawndale Ave. Kalamazoo, MI 49048

724-284-1213

www.landscapeforms.com

D. Style:

1. Square: 41-5/8 inches

a. Metal

E. Size:

1. Height: 29-1/8 inches

- F. Table base:
  - 1. Strap Base
- G. Table Tops
  - 1. Metal: Tabletop is formed 12 gauge HRP&O. Cross braces are 2-1/2" steel A36 channels. Corner braces are 1" steel A36 angles.
- H. Table Supports:
  - 1. Strap base: Formed of 3" wide x 3/8" thick A36 HRP&O steel. Adjustable glides are stainless steel.
    - a. Small strap base gussets are 3/8" thick A36 HRP&O steel plate.
- I. Finishes:
  - 1. Finish on Carbon Steel: Landscape Forms, Inc. "Panguard II"
    - a. Primer: Rust Inhibitor
    - b. Topcoat: Thermosetting polyester powdercoat. UV, chip, and flake resistant.
    - c. Table Support Color: Silver
    - d. Tabletop Color: Silver
- J. Total: 18
- K. Mounting: Movable Furniture
- 2.3 Chairs
  - A. Products: Contractor Furnished / Contractor Installed. Subject to compliance with requirements, provide the following:

- B. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings LandscapeForms Windmark Chair, or a comparable product by one of the following:
  - 1. Anova (Tuscany Series).
  - 2. Forms+Surfaces (Avivo Table & Chairs).
- C. Manufacturer:

Landscape Forms, Inc 431 Lawndale Ave. Kalamazoo, MI 49048 724-284-1213

www.landscapeforms.com

- D. Style:
  - 1. Backed, no arms
  - 2. Seat Panels: Wood
- E. Materials:
  - 1. End Frames: Cast 356 Aluminum (Width 1-3/4 inches)
  - 2. Cross Brace: Aluminum 6061 welded to the end frames
  - 3. Seat and Seat Back Panels:
    - a. Wood for Exterior Use:
      - 1) Nominal Board Size: 5-9/16" wide x 1-1/4" thick
      - 2) Board Edges and Ends: Eased
        - a) Ipe: Solid stock, select South American hardwood
  - 4. Glides: Nylon 6/6
    - a. Small strap base gussets are 3/8" thick A36 HRP&O steel plate.
- F. Finishes:
  - 1. Finish on Metal: Landscape Forms, Inc. "Panguard II"
    - a. Primer: Rust Inhibitor
    - b. Topcoat: Thermosetting polyester powdercoat. UV, chip, and flake resistant.
    - c. Frame Color: Silver
    - d. Finish on Wood: Unfinished
- G. Total: 52
- H. Mounting: Movable Furniture
- 2.4 BOLLARDS
  - A. Products: Contractor Furnished / Contractor Installed. Subject to compliance with requirements, provide the following:

- B. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings Cal Pipe Security Bollards or a comparable product by one of the following:
  - 1. Secure USA Defense Solutions.
  - 2. Reliance Foundry Bollards.
- C. Manufacturer:

Calpipe Industries, Inc 19440 S. Dominguez Hills Dr. Rancho Dominguez, CA 90220 (562) 803-4388 www.calpipe.com

- D. Material: Stainless Steel, type 316 grade, polished to a #4 finish.
- E. Dimension: 6" diameter, 36" ht.
- F. Bollard Cap: Flat.
- G. Support Frames: Fixed bollard, individual footing. Follow manufacturer spec.
- H. Total: 12

## 2.5 TREE GRATE

- A. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings Urban Accessories Flat Rainbow or a comparable product by one of the following:
  - 1. US Foundry 9518 Tree Grate.
  - 2. Ironsmith Olympian Tree Grates.
- B. Manufacturer:

Urban Accessories 465 East 15<sup>th</sup> Street Tacoma, WA 98421 877-487-0488

www.urbanaccessories.com

- C. Shape: Round
- D. Size: 6' Diameter
- E. Material: 100% Recycled Aluminum
- F. Finish: Brush
- G. Installation: As per manufacturers recommendation

# F. Quantity: 1

# 2.6 FABRICATION

- A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.
- B. Welded Connections: Weld connections continuously. Weld solid members with full-length, full-penetration welds and hollow members with full-circumference welds. At exposed connections, finish surfaces smooth and blended so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.
- C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of handrail and railing components.
- D. Preservative-Treated Wood Components: Complete fabrication of treated items before treatment if possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces.
- E. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.
- F. Factory Assembly: Assemble components in the factory to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

# 2.7 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

# 2.8 STEEL AND GALVANIZED STEEL FINISHES

A. Baked-Enamel, Powder-Coat Finish: Products shall be undercoated with a rustproofing product and finished with a polyester powdercoat. This must be an environmentally

friendly metal finishing process that does not contain heavy metals (lead-free), is free of hazardous air pollutants (HAPS-free), does not generate hazardous waste and contains less than 1% Volatile Organic Compounds (VOCs). Powdercoating application process shall minimize overspray, to create less waste powder. Manufacturer's standard, baked, polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

B. PVC Finish: Manufacturer's standard, UV-light stabilized, mold-resistant, slip-resistant, matte-textured, dipped or sprayed-on, PVC-plastisol finish, with flame retardant added; complying with coating manufacturer's written instructions for pretreatment, application, and minimum dry film thickness.

## 2.9 IRON FINISHES

A. Baked-Enamel, Powder-Coat Finish: Manufacturer's standard, baked, polyester, powder-coat finish complying with finish manufacturer's written instructions for surface preparation, including pretreatment, application, baking, and minimum dry film thickness.

# 2.10 STAINLESS-STEEL FINISHES

- A. Remove tool and die marks and stretch lines or blend into finish.
- B. Grind and polish surfaces to produce uniform, directionally textured, polished finish indicated, free of cross scratches. Run grain with long dimension of each piece.

#### PART 3 - EXECUTION

# 3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

# 3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

- B. Unless otherwise indicated, install site furnishings after landscaping and paving have been completed.
- C. Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings.
- D. Post Setting: Set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
- E. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings and 3/4 inch (19 mm) larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.
- F. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with nonshrink, nonmetallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions, with top smoothed and shaped to shed water.

# 3.3 CLEANING

A. After completing site furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

END OF SECTION 129300

