Susan I. Hamilton, M.S.W., J.D.
Commissioner

DEPARTMENT of CHILDREN and FAMILIES

Making a Difference for Children, Families and Communities

M. Jodi Rell
Governor

School Rehab
High Meadows
Hamden, CT

Project No. 20-HMCF-096

BID OPENING **2:00P.M.** **Revised** **JANUARY 21, 2009**

ADDENDUM NUMBER 3 DATE OF ADDENDUM: JANUARY 8, 2008

The following clarifications are applicable to Drawings and Specifications for the project referenced above:

Item 1: **Bid opening date change to January 21, 2009 at 2:00pm due to Holiday on 1/19/09.**

Item 2: Existing heating loop has isolation valves should these valves not hold a shut down within the work day is possible.

Item 3: Window sill tiles shall be 12" wide so that one tile will cove the sill from back to front.

Item 4: Drawing A2.02 added - Elevations of new entrance store front.

Item 5: Maximum building occupancy levels - 50 students + 25 faculty

Item 6: All heating and supply and return lines are on exterior walls (no line in corridor)

Item 7: Bathrooms contain base board heat to be removed. No heat will be provided for bathrooms.

Item 8: Kitchen Rm 374 - all upper cabinets will remain. Micro waves will be removed by owner for painting.

STATE OF CONNECTICUT
Phone (860) 550-6669 - Fax (860) 560-5019
505 Hudson Street, Hartford, Connecticut 06106-7107
E-Mail: richard.grossman@po.state.ct.us
www.state.ct.us./dcf

Item 9: Media Rm. 367 - Roof mounted fan to be removed and opening capped if not reused for fresh air system. Ceiling register to be removed and disposed.

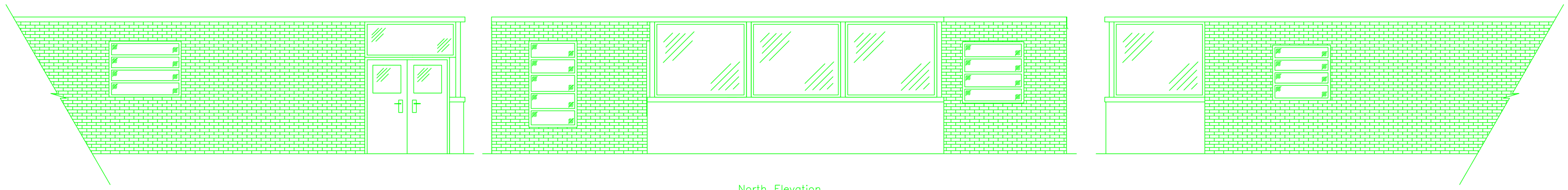
Item 10: No heat is to be provided in the new vestibule.

Item 11: The existing EPDM roof has not warrantee and is scheduled to be replaced.

This Addendum must be Signed & Returned with your Bid.

_____ _____

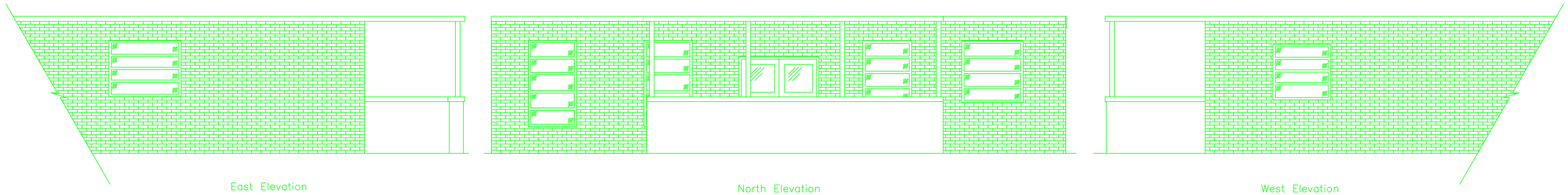
Authorized Signature of Bidder Company Name



East Elevation
New

North Elevation
New

West Elevation
New



East Elevation
Existing

North Elevation
Existing

West Elevation
Existing

Department
of
Children
and
Families

Engineering
Denise Landry
Chief of Engineering Services

HIGH MEADOWS
825 Hartford Tnpk.
Hamden, CT

SCHOOL REHAB.

Plant Facitities Engineer
Frank Provenzano

SCALE:	1/4" = 1'-0"
PROJECT NUMBER:	20-HMCF-096
ISSUED:	December 16, 2008
DRAWN BY:	RCG
CHECKED BY:	
FILE NAME:	[illegible]

ENTRANCE STORE FRONT
SCHOOL BUILDING
A 2.02

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High Meadows
Hamden, CT

Project No. 20-HMCF-096

BID OPENING **2:00P.M.** **Revised** **JANUARY 19, 2009**

ADDENDUM NUMBER 2 DATE OF ADDENDUM: DECEMBER 19, 2008

The following clarifications are applicable to Drawings and Specifications for the project referenced above:

Item 1: Confirming the list of drawings for the project to be seven (7) as listed (A00.1, D10.1, A10.1, A1.02, M1.01, E.002, A1.02)

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_____ _____

Authorized Signature of Bidder Company Name

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Hamden, CT

Project No. 20-HMCF-096

BID OPENING **2:00P.M.** **Revised** **JANUARY 19, 2009**

ADDENDUM NUMBER 1 DATE OF ADDENDUM: DECEMBER 17, 2008

The following clarifications are applicable to Drawings and Specifications for the project referenced above:

Item 1: Bid Opening Date has been changed to **JANUARY 19, 2008**.

Item 2: Contractor shall provide new windows sills comprising of ¾" plywood and tile.

Item 3: General Requirements, Section 01010, Summary of Work, Item E - Delete "Work shall be complete, ready for occupancy on June 22, 2007."

Item 4: General Requirements, Section 01310, Construction Schedule, Item B and C - The owner is waiving the requirement of "Microsoft Project" for producing a schedule.

Item 5: Added Prevailing wage rate "packet".

Item 6: Added Specification Section 15700 - HVAC Systems

Item 7: Added Drawings A00.1, D10.1, A10.1, A1.02, M1.01, E.002, A1.02

Item 8: All drawings are 1/8" = 1'-0" except for Section A-A which is ½"=1'-0"

This Addendum must be Signed & Returned with your Bid.

_____ _____

Authorized Signature of Bidder Company Name

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Section 15700
Mechanical HVAC

Part 1 – General

1.01 SYSTEM DESCRIPTION

The variable capacity, heat pump heat recovery air conditioning system shall be a Mitsubishi Electric CITY MULTI VRFZ (Variable Refrigerant Flow Zoning) System. The CITY MULTI VRFZ systems shall be the R2-Series (simultaneous cooling and heating) split system heat pump and the Y-Series (cool/heat) split system heat pump.

The R2-Series system shall consist of a PURY outdoor unit, BC (Branch Circuit) Controller, multiple indoor units (-E models), and M-NET DDC (Direct Digital Controls). Each indoor unit or group of indoor units shall be capable of operating in any mode independently of other indoor units or groups. System shall be capable of changing mode (cooling to heating, heating to cooling) with no interruption to system operation. Each indoor unit or group of indoor units shall be independently controlled.

The PUHY outdoor unit shall be a vertical discharge, 208/230 volt, three phase unit.

1.02 QUALITY ASSURANCE

A. The units shall be listed by Electrical Laboratories (ETL) and bear the ETL label.
B. All wiring shall be in accordance with the National Electrical Code (N.E.C.).
C. The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).
D. A full charge of R-410A for the condensing unit only shall be provided in the condensing unit.

1.03 DELIVERY, STORAGE AND HANDLING

A. Unit shall be stored and handled according to the manufacturerôs recommendation.

Part 2 – Warranty

2.01 The units shall be covered by an extended manufacturerôs limited warranty for a period of five (5) years from date of installation.

The systems shall be:

1) designed by a certified CITY MULTI Diamond Designer,
2) installed by a certified CITY MULTI Diamond Dealer, AND
3) verified with a completed commissioning report submitted to Mitsubishi Electric Service Department,

In addition the compressor shall have a manufacturerôs limited warranty for a period of six (6) years from date of installation.

If, during this period, any part should fail to function properly due to defects in workmanship or material, it shall be replaced or repaired at the discretion of the manufacturer.

This warranty shall not include labor.

2.02 Manufacturer shall have a minimum of twenty-five years of HVAC experience in the U.S. market.

2.03 The CITY MULTI VRFZ system shall be installed by a Mitsubishi authorized CITY MULTI Diamond Dealer with extensive CITY MULTI install and service training. The mandatory contractor service and install training should be performed by the manufacturer.

Part 3 – Products

3.01 R2-SERIES OUTDOOR UNIT

A. General:

The R2-Series PURY outdoor unit shall be used specifically with CITY MULTI VRFZ components. The R2-Series shall consist of the PURY outdoor unit, Branch Circuit (BC) Controller, indoor units (-E models), and M-NET DDC (Direct Digital Controls). The PURY outdoor units shall be equipped with multiple circuit boards that interface to the M-NET controls system and shall perform all functions necessary for operation. The outdoor unit shall have a powder coated finish. The outdoor unit shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory.

1. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of outdoor rated capacity.
2. Outdoor unit shall have a sound rating no higher than 63 dB(A).
3. Both refrigerant lines from the outdoor unit to the BC (Branch Circuit) Controller (Single or Main) shall be insulated.
4. There shall be no more than 3 branch circuit controllers connected to any one outdoor unit.
5. The outdoor unit shall have an accumulator with refrigerant level sensors and controls.
6. The outdoor unit shall have a high pressure safety switch, over-current protection and DC bus protection.
7. The outdoor unit shall have the ability to operate with a maximum height difference of 164 feet and have total refrigerant tubing length of 984-1312 feet. The greatest length is not to exceed 492 feet between outdoor unit and the indoor units without the need for line size changes or traps.
8. The outdoor unit shall be capable of operating in heating down to -4°F ambient temperature without additional low ambient controls.
9. The outdoor unit shall not cease operation in any mode based solely on outdoor ambient temperature.
10. The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.

B. Unit Cabinet:
   1. The casing(s) shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel.

C. Fan:
   1. The PURY-P72 / P96 / P108 / P126 / P144TGMU outdoor unit shall be furnished with one direct drive, variable speed propeller type fan.
   2. The PURY-P168 / P192 / P204 / P216 / P234TGMU outdoor unit shall be furnished with two direct drive, variable speed propeller type fans.
   3. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.
   4. All fan motors shall be mounted for quiet operation.
   5. All fans shall be provided with a raised guard to prevent contact with moving parts.
   6. The outdoor unit shall have vertical discharge airflow.

D. Refrigerant
   1. R410A refrigerant shall be required for PURY-P-TGMU-A outdoor unit systems.

E. Coil:
   1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
   2. The coil fins shall have a factory applied corrosion resistant blue-fin finish.
   3. The coil shall be protected with an integral metal guard.
   4. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.
   5. The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.

F. Compressor:
   1. The PURY-P72 / P96 / P108 / P126 / P144TGMU outdoor units shall be equipped with one inverter driven scroll hermetic compressor.
   2. The PURY-P168 / P192 / P204 / P216 / P234TGMU outdoor unit shall be equipped with one inverter driven scroll hermetic compressor and one scroll hermetic compressor.
   3. A crankcase heater(s) shall be factory mounted on the compressor(s).
   4. The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable down to 16% of rated capacity.
   5. The compressor will be equipped with an internal thermal overload.
   6. The compressor shall be mounted to avoid the transmission of vibration.

G. Electrical:
   1. The outdoor unit electrical power shall be 208/230 volts, 3-phase, 60 hertz.
   2. The outdoor unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz).
   3. The outdoor unit shall be controlled by integral microprocessors.
   4. The control circuit between the indoor units, BC Controller and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

3.02 BRANCH CIRCUIT (BC) CONTROLLERS FOR R2-SERIES SYSTEMS

A. General:

The BC (Branch Circuit) Controllers shall be specifically used with R410A R2-Series systems. These units shall be equipped with a circuit board that interfaces to the M-NET controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish. The BC Controller shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory. This unit shall be mounted indoors. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of rated capacity.

B. BC Unit Cabinet:
   1. The casing shall be fabricated of galvanized steel.
   2. Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves.
   3. The unit shall house two tube-in-tube heat exchangers.

C. Refrigerant
   1. R410A refrigerant shall be required for CMB-P-NU-G/GA/GB BC Controllers in conjunction with PURY-P-TGMU-A outdoor unit systems.

D. Refrigerant valves:
   1. The unit shall be furnished with multiple branch circuits which can individually accommodate up to 54,000 BTUH and/or three indoor units. Branches may be twinned to allow more than 54,000 BTUH.
   2. Each branch shall have multiple two-position valves to control refrigerant flow.
   3. Service shut-off valves shall be field-provided/installed for each branch to allow service to any indoor unit without field interruption to overall system operation.
   4. Linear electronic expansion valves shall be used to control the variable refrigerant flow.

E. Integral Drain Pan:
   1. An integral condensate pan and drain shall be provided.

F. Electrical:
   1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
   2. The unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz).
   3. The BC Controller shall be controlled by integral microprocessors.
   4. The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

4.01 PLFY-P**NBMU-E (4-WAY CEILING-RECESSED CASSETTE WITH GRILLE) INDOOR UNIT

A. General:
   1. The PLFY shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

B. Unit Cabinet:
   1. The cabinet shall be space-saving ceiling-recessed cassette.
   2. The cabinet panel shall have provisions for a field installed filtered outside air intake.
   3. Branch ducting shall be allowed from cabinet.
   4. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.
   5. The grille vane angles shall be individually adjustable from the wired remote controller to customize the airflow pattern for the conditioned space
C. Fan:
   1. The indoor fan shall be an assembly with a turbo fan direct driven by a single motor.
   2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
   3. The indoor fan shall consist of five (5) speed settings, Low, Mid1, Mid2, High and Auto.
   4. The fan shall have a selectable Auto fan setting that will adjust the fan speed based on the difference between controller set-point and space temperature.
   5. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
   6. The indoor unit shall have switches that can be set to provide optimum airflow based on ceiling height and number of outlets used.
   7. The indoor unit vanes shall have 5 fixed positions and a swing feature that shall be capable of automatically swinging the vanes up and down for uniform air distribution.
   8. The vanes shall have an Auto-Wave selectable option in the heating mode that shall randomly cycle the vanes up and down to evenly heat the space.
   9. If specified, the grille shall have an optional i-see sensor that will measure room temperature variations and adjust the airflow accordingly to evenly condition the space.
D. Filter:
   1. Return air shall be filtered by means of a long-life washable filter
E. Coil:
   1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
   2. The tubing shall have inner grooves for high efficiency heat exchange.
   3. All tube joints shall be brazed with phos-copper or silver alloy.
   4. The coils shall be pressure tested at the factory.
   5. A condensate pan and drain shall be provided under the coil.
   6. The unit shall include a condensate lift mechanism that will be able to raise drain water 33 inches above the condensate pan.
   7. Both refrigerant lines to the PLFY indoor units shall be insulated.
F. Electrical:
   1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
   2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).
G. Controls:
   1. This unit shall use controls provided by Mitsubishi Electric to perform functions necessary to operate the system.

4.02 PLFY-P**NCMU-E (4-WAY CEILING-RECESSED CASSETTE WITH GRILLE) INDOOR UNIT

A. General:
   1. The PLFY shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

B. Unit Cabinet:
   1. The cabinet shall be a compact 22-7/16ò wide x 22-7/16ò deep so it will fit within a standard 24ò square suspended ceiling grid.
   2. The cabinet panel shall have provisions for a field installed filtered outside air intake.
   3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.

C. Fan:
   1. The indoor fan shall be an assembly with a turbo fan direct driven by a single motor.
   2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
   3. The indoor fan shall consist of three (3) speeds, Low, Mid, and High.
   4. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
   5. The auto air swing vanes shall be capable of automatically swinging up and down for uniform air distribution.

D. Filter:
   1. Return air shall be filtered by means of a long-life washable filter.

E. Coil:
   1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
   2. The tubing shall have inner grooves for high efficiency heat exchange.
   3. All tube joints shall be brazed with phos-copper or silver alloy.
   4. The coils shall be pressure tested at the factory.
   5. A condensate pan and drain shall be provided under the coil.
   6. The unit shall include a condensate lift mechanism that will be able to raise drain water 19-3/4ò inches above the condensate pan.
   7. Both refrigerant lines to the PLFY indoor units shall be insulated.

F. Electrical:
   1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
   2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls:
   1. This unit shall use controls provided by Mitsubishi Electric to perform functions necessary to operate the system.

4.03 PMFY (1-WAY CEILING-RECESSED CASSETTE WITH GRILLE) INDOOR UNIT

A. General:
The PMFY shall be a one-way cassette indoor unit that recesses into the ceiling with a ceiling grille and shall have a modulating linear expansion device. The PMFY shall be used with the R2-Series outdoor unit and BC Controller, Y-Series outdoor unit, or S-Series outdoor unit. The PMFY shall support individual control using M-NET DDC controllers.

B. Indoor Unit.
The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

C. Unit Cabinet:
1. The cabinet shall be space-saving ceiling recessed.
2. The cabinet panel shall have provisions for a field installed filtered outside air intake.
3. Branch ducting shall be allowed from cabinet.
4. The one-way grille shall be fixed to bottom of cabinet allowing for one-way airflow.

D. Fan:
1. The indoor fan shall be an assembly with one line-flow fan direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall consist of four (4) speeds, Low, Mid1, Mid2, and High.

E. Filter:
1. Return air shall be filtered by means of a long-life washable permanent filter.

F. Coil:
1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. All tube joints shall be brazed with phos-copper or silver alloy.
4. The coils shall be pressure tested at the factory.
5. A condensate pan and drain shall be provided under the coil.
6. The condensate lift mechanism shall be able to raise drain water 23 inches above the condensate pan.
7. Both refrigerant lines to the PMFY indoor units shall be insulated.

G. Electrical:
1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

H. Controls:
1. This unit shall use controls provided by Mitsubishi Electric to perform functions necessary to operate the system. Please refer to Part 5 of this guide specification for details on controllers and other control options.

4.04 PCFY (CEILING-SUSPENDED) INDOOR UNIT

A. General:
The PCFY shall be ceiling-suspended indoor unit section providing powerful airflow and shall have a modulating linear expansion device. The PCFY shall be used with the R2-Series outdoor unit and BC Controller(s), Y-Series outdoor unit, or S-Series outdoor unit. The PCFY shall support individual control using M-NET DDC controllers.

B. Indoor Unit
The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

C. Unit Cabinet:
1. The casing shall have a white finish.

D. Fan:
1. The indoor unit fan shall be an assembly with two, three, or four Sirocco fan(s) direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall consist of four (4) speeds, Low, Mid1, Mid2, and High.

E. Filter:
1. Return air shall be filtered by means of an easily removable, washable filter.

F. Coil:
1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. All tube joints shall be brazed with phos-copper or silver alloy.
4. The coils shall be pressure tested at the factory.
5. A condensate pan and drain shall be provided under the coil.
6. Both refrigerant lines to the PCFY indoor units shall be insulated.

G. Electrical:
1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz)

H. Controls:
1. This unit shall use controls provided by Mitsubishi Electric to perform functions necessary to operate the system. Please refer to Part 5 of this guide specification for details on controllers and other control options.

Part 5 – Controls

5.01 Overview

A. General:
The CITY MULTI Controls Network (CMCN) shall be capable of supporting remote controllers, schedule timers, system controllers, centralized controllers, an integrated web

based interface, graphical user workstation, and system integration to Building Management Systems via BACnet® and LonWorks®.

5.02 Electrical Characteristics

A. General:
The CMCN shall operate at 24VDC.

B. Wiring:
Control wiring shall be installed in a system daisy chain configuration from indoor unit to ME remote controller to indoor unit, to the BC controller (main and subs, if applicable) and to the outdoor unit.

Control wiring for schedule timers, system controllers, and centralized controllers shall be installed in a daisy chain configuration from outdoor unit to outdoor unit, to system controllers, to the power supply.

C. Wiring type:
Wiring shall be 2-conductor (16 AWG or 18 AWG), twisted shielded pair, stranded wire, as defined by the Design Tool AutoCAD output.

Network wiring shall be CAT-5e with RJ-45 connection.

5.03 CITY MULTI Controls Network

The CITY MULTI Controls Network (CMCN) consists of remote controllers, schedule timers, system controllers, and centralized controllers.

CMCN System Configuration

5.04 CMCN: Remote Controllers

A. Deluxe MA Remote Controller (PAR-21MAA)
The Deluxe MA Remote Controller (PAR-21MAA) shall be capable of controlling up to 16 indoor units (defined as 1 group). The Deluxe MA Remote Controller shall be approximately 5ò x 5ò in size and white in color with a light-green LCD display. The PAR-21MAA shall support a selection from multiple languages (Spanish, German, Japanese, Chinese, English, Russian, Italian, or French) for display information. The Deluxe MA supports temperature display selection of Fahrenheit or Celsius. The Deluxe MA Remote Controller shall control the following grouped operations: On/Off, Operation Mode (cool, heat, auto (R2-Series only), dry, and fan), temperature set point, fan speed setting, and airflow direction setting. The Deluxe MA Remote Controller shall support timer settings of on/off/temperature up to 8 times in a day in 1-minute increments. The Deluxe MA Remote Controller shall support an Auto Off timer. The Deluxe MA Remote Controller shall be able to limit the set temperature range from the Deluxe MA. The room temperature shall be sensed at either the Deluxe MA Remote Controller or the Indoor Unit dependent on the indoor unit dipswitch setting. The Deluxe MA Remote Controller shall display a four-digit error code in the event of system abnormality/error.

The Deluxe MA Remote Controller shall only be used in the same group with other Deluxe MA Remote Controllers (PAR-21MAA), Wireless MA (PAR-FL32MA / PAR-FA32MA), or Simple MA Remote Controllers (PAC-YT51CRB), with up to two remote controllers per group.

The Deluxe MA Remote Controller shall require no addressing. The Deluxe MA Remote Controller shall connect using two-wire, stranded, non-polar control wire to TB15 connection terminal on the indoor unit. The PAR-21MAA shall require cross-over wiring for grouping across indoor units.

PAR-21MAA (Deluxe MA Remote Controller)			
Item	**Description**	**Operation**	**Display**
ON/OFF	Run and stop operation for a single group	Each Group	Each Group
Operation Mode	Switches between Cool/Dry/Auto/Fan/Heat. Operation modes vary depending on the air conditioner unit. Auto mode is in the R2-Series only.	Each Group	Each Group
Temperature Setting	Sets the temperature for a single group. Range of temperature setting Cool/Dry: 67°F-87°F (57°F-87°F for PEFY/PDFY/PFFY-E) Heat: 63°F-83°F (63°F-83°F for PEFY/PDFY/PFFY-E) Auto: 67°F-83°F (63°F-83°F for PEFY/PDFY/PFFY-E)	Each Group	Each Group
Fan Speed Setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	Each Group	Each Group
Air Flow Direction Setting	Air flow direction angles 100%-80%-60%-40%, Swing, Louver ON/OFF. Air flow direction settings vary depending on the model.	Each Group	Each Group
Weekly Scheduler	ON/OFF/Temperature setting can be done up to 8 times one day in the week. The time can be set by the 1-minute interval.	Each Group	Each Group

PAR-21MAA (Deluxe MA Remote Controller)			
Item	**Description**	**Operation**	**Display**
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). *1: Centrally Controlled is displayed on the remote controller for prohibited functions.	N/A	Each Group *1
Prohibition / Permission of Specified Mode	Setting via the System Controller, the operation for the following modes is prohibited: Cooling Prohibited: Cool, Dry, Auto Heating Prohibited: Heat, Auto Cooling-Heating Prohibited: Cool, Heat, Dry, Auto	N/A	Each Group
Display Indoor Unit Intake Temp	Measures and displays the intake temperature of the indoor unit when the indoor unit is operating.	N/A	Each Group
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed	N/A	Each Unit
Test Run	Operates air conditioner units in test run mode.	Each Group	Each Group
Ventilation Equipment	Up to 16 indoor units can be connected to an interlocked system that has one LOSSNAY unit. LOSSNAY items that can be set are ñHiò, ñLowò, and ñStopò. Ventilation mode switching is not available.	Each Group	Each Group
Set Temperature Range Limit	The range of room temperature setting can be limited by the initial setting. The lowest limit temperature can be made higher than the usual (67°F) in cool/dry mode, while the upper limit temperature lower than the usual (83°F) in heat mode. *Function does not work in auto mode setting	Each Group	Each Group
Auto Lock Out Function	Setting/releasing of simplified locking for remote control buttons can be performed. • Locking of all buttons • Locking of all buttons except ON/OFF button	Each Group	Each Group

5.05 CMCN: System Controllers

A. PAC-YT40ANRA: ON/OFF Controller

The PAC-YT40NARA ON/OFF Controller shall be capable of turning ON/OFF up to sixteen groups of indoor units, for a maximum of 50 indoor units. All of the units, up to 50, shall be turned ON/OFF using the main switch. A LED for each group of indoor units, up to

16 groups, shall indicate if there is a failure within each group by flashing. A main LED shall flash if there is an error on any one of the 16 groups for a maximum of 50 indoor units. A LED shall indicate the ON/OFF status for each group of indoor units. The PACY-YT40ANRA shall be approximately 5ò x 5ò in size and shall be powered using either the PAC-SC50KUA Power Supply on TB 7 of the outdoor unit or via the indoor transmission line on TB 3 on the outdoor unit. The ON/FF Controller can output via level signal operation state and error state.

PAC-YT40ANRA (ON/OFF Controller)			
Item	**Description**	**Operation**	**Display**
ON/OFF	Run and stop operation for the air conditioner units	Group or Collective	Group or Collective
Operation Mode	Not Available	N/A	N/A
Temperature Setting	Not Available	N/A	N/A
Fan Speed Setting	Not Available	N/A	N/A
Air Flow Direction Setting	Not Available	N/A	N/A
Room Temp Display	Not Available	N/A	N/A
Error	LED flashes during failure. (The error code can be confirmed by removing the cover.)	N/A	Each Group
Schedule Operation	Not Available	N/A	N/A
Ventilation Operation (Independent)	Group operation of only LOSSNAY units possible. * Only ON/OFF of group	Each Group	Each Group
Ventilation Operation (Interlocked)	The LOSSNAY will run in interlock with the operation of indoor unit. * The fan rate and mode cannot be changed. The LED will turn ON only during operation after interlocking.	Each Group	Each Group
External Output	Error Output, Operation Output ñON/OFFò and ñerror/normalò are output with level signal. * The optional output cable is required	Group or Collective	Group or Collective
Connection Position	Central System Transmission Line: Connectable (PAC-SC50KUA Power Supply is needed. Indoor/Outdoor Transmission Line: Connectable	N/A	N/A

B. PAC-YT34STA: SCHEDULE TIMER

The Schedule Timer (PAC-YT34STA) shall schedule operation for a maximum of 50 indoor units. The maximum number of indoor units supported per one group shall be 16. The maximum number of groups supported shall be 50. The Schedule Timer shall be used in conjunction with PAR-21MAA (Deluxe MA Remote Controllers), Wireless MA (PAR-FL32MA-E / PAR-FA32MA-E), and/or PAR-F27MEA (ME Remote Controllers).

The Schedule Timer shall support up 9 scheduling patterns with up to 16 operations per pattern. Operations shall include on/off, mode selection (cool, heat), set temperature, and prohibition of remote controller functions (on/off, operation mode change, and set temperature adjustment). Patterns shall be applied to each group of indoor units on a per-day basis. The minimum time interval shall be 5-minutes. The Schedule Timer shall display a four-digit error code in the event of system abnormality/error.

The Schedule Timer shall be manually addressed using rotary dial switch to the M-NET communication bus. The Schedule Timer shall be powered using either the PAC-SC50KUA Power Supply or via the indoor transmission line.

The Schedule Timer can be used in conjunction with G-50A Centralized Controller which has higher priority but requires change in dipswitch setting. The Schedule Timer shall accept level or pulse input signals and shall output level signals for specific functions, as defined in below table.

PAC-YT34STA (Schedule Timer)				
Item		**Description**	**Operation**	**Display**
Unit Control		50 units/ 50 groups (Maximum 16 units connected in one group)	Group or Collective	Each Group
Schedule Control		One week.	Each Group	Each Group
Operation	ON/OFF	ON/OFF operations can be carried out collectively or for each group.	Each Group	Each Group
	Timer Reset	The timer setting details can be disabled collectively.	Each Group	Each Group
Schedule Function	Setting Details	ON/OFF COOL/HEAT Room temperature setting (67°F to 83°F) Operation prohibit (ON/OFF, operation mode, setting temperature)	Each Group	N/A
	Number of Settings	Number of setting patterns: Ten (no setting + nine patterns) (Operation for a week can be set by selecting one of ten patterns for each day.) Number of operations: Up to 16 operations can be set in one pattern.	Each Group	N/A
	Time Setting Unit	The item can be set in five-minute units.	Each Group	N/A

PAC-YT34STA (Schedule Timer)				
Item		**Description**	**Operation**	**Display**
Display		Current time and day	N/A	Each Group
		Error state	N/A	Each Group
		Unit operation state	N/A	N/A
External Input	Timer Connection and Emergency Stop Input, etc.	The following can be input with the level signals or pulse signals. Level signal: ñEmergency stop inputò or ñCollective ON/OFFò Pulse signal: ñCollective ON/OFFò or ñLocal remote controller prohibit/permitò One input can be selected from those above.	Each Group	N/A
External Output	Error Output, Operation Output	ñON/OFFò and ñerror/normalò are output with the level signal. * Optional output cable is required.	Each Group	N/A
Connection Position		Indoor/outdoor transmission line: Connectable Central system transmission line: Connectable (Optional power supply PAC-SC50KUA) is needed).	N/A	N/A

C. System Group Controller (PAC-SF44SRA)
The System Centralized Controller (PAC-SF44SRA) shall be capable of controlling a maximum of 50 groups or a maximum of 50 indoor units across multiple CITY MULTI outdoor units. The System Group Controller shall be approximately 5òx 5ò in size and shall be powered using either the PAC-SC50KUA Power Supply on TB 7 of the outdoor unit or via the indoor transmission line on TB 3 on the outdoor unit. The System Group Controller shall have operation controls which can be applied to an individual indoor unit, a group of indoor units (up to 50 indoor units), or all indoor units (collective batch operation). This control set of operation controls for the System Group Controller shall include on/off, operation mode selection (cool, heat, auto (R2-Series only), dry, and fan), and temperature setting. The System Group Controller shall be able to enable or disable operation of local remote controllers.

END OF SECTION

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after u 1, 2* , 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 http://www.osha.gov/fso/ote/training/edcenters/fact_sheet.html;

(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 *ona 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.

(16) 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 http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm; 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.

Sec. 31-53b. **Construction safety and health course**. **Proof of completion required for employees on public building projects. Enforcement. Regulations**. (a) Each contract entered into on or after July 1, 2007, 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 an 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, shall contain a provision requiring that, not later than thirty 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 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 hours of training in accordance with 29 CFR 1910.268.

(b) Any employee required to complete a construction safety and health course required under subsection (a) of this section who has not completed the course shall be subject to removal from the worksite if the employee does not provide documentation of having completed such course by the fifteenth day after the date the employee is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2007, 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 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) For the purposes of this section, "public building" means a structure, paid for in whole or in part with state funds, within a roof and within exterior walls or fire walls, designed for the housing, shelter, enclosure and support or employment of people, animals or property of any kind, including, but not limited to, sewage treatment plants and water treatment plants, "Public building" does not include site work, roads or bridges, rail lines, parking lots or underground water, sewer or drainage systems including pump houses or other utility systems.

November 29, 2006

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.

Project: Rehabilitation To High Meadows School

Minimum Rates and Classifications for Building Construction

B 11608

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 20-HMCF-096 **Project Town** Hamden

Project: Rehabilitation To High Meadows School

CLASSIFICATION	Hourly Rate	Benefits
1a) 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.	34.21	19.81
1b) 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) Hazardous Material Handler: Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials, whether they contain asbestos or not, from mechanical systems.	20.50	10.30
2) Boilermaker	32.73	8.72 + 33%
3a) Bricklayer, Cement Mason, Cement Finishers, Plasterers, Stone Masons	31.60	18.98 + a
3b) Tile Setter	30.78	16.98

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3c) Terrazzo Workers, Marble Setters	30.91	19.12
3d) Tile, Marble & Terrazzo Finishers	24.90	14.78
------LABORERS------		
4) Group 1: Laborers, carpenter tenders, wrecking laborers, fire watchers.	23.25	14.00
4a) Group 2: Mortar mixers, plaster tenders, power buggy operators, powdermen, fireproofer/mixer/nozzleman.	23.50	14.00
4b) Group 3: Jackhammer operators, mason tenders.	23.75	14.00
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) [If using this classification call the Labor Department for clarification]	24.10	14.00
4d) Group 5: Air track operators, Sand blasters.	24.00	14.00
4e) Group 6: Nuclear toxic waste removers, blasters.	26.25	14.00
4f) Group 7: Asbestos removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped).	24.25	14.00

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4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew.	23.75	14.00
4h) Group 9: Top men on open air caisson, cylindrical work and boring crew.	23.25	14.00
5) Carpenter, Acoustical Tile Worker, Concrete Form-Wood Builder, Floor Covering (Including Drywall Hanging), Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	27.90	16.96
5a) Millwrights	28.65	16.96
6) Electrical Worker, Cable Splicer (electric) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	34.20	18.33
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	41.34	16.285+a+b
8) Glazier (Trade License required: FG-1,2)	31.43	14.00 + a
9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	31.80	23.18 + 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.	33.05	16.90 + a

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Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer)	32.73	16.90 + a
Group 3: Excavator; Cranes (under 100 ton rated capacity), Gradall; 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	31.99	16.90 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	31.60	16.90 + a
Group 5: Specialty Railroad Equipment; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	31.01	16.90 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	31.01	16.90 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	30.70	16.90 + a
Group 7: Asphalt roller, concrete saws and cutters (ride on types), vermeer concrete cutter, Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrell).	30.36	16.90 + a
Group 8: Mechanic, grease truck operator, hydroblaster; barrier mover; power stone spreader; welding; work boat under 26 ft.; transfer machine.	29.96	16.90 + a
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).	29.53	16.90 + a
Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	27.49	16.90 + a

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Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	27.49	16.90 + a
Group 12: Wellpoint operator.	27.43	16.90 + a
Group 13: Compressor battery operator.	26.85	16.90 + a
Group 14: Elevator operator; tow motor operator (solid tire no rough terrain).	25.71	16.90 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	25.30	16.90 + a
Group 16: Maintenance engineer.	24.65	16.90 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	28.96	16.90 + a
Group 18: Power safety boat; vacuum truck; zim mixer; sweeper; (Minimum for any job requiring a CDL license).	26.54	16.90 + a
------PAINTERS (Including Drywall Finishing)------		
10a) Brush, Roller	27.87	14.00

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10b) Taper	28.62	14.00
10c) Paperhanger	28.37	14.00
10d) Red Label	28.37	14.00
10e) Blast and Spray	30.87	14.00
10f) Tanks, Tower, Swingstage	29.87	14.00
11) Plumber (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	35.37	19.71
12) Post Digger, Well Digger, Pile Testing Machine	26.25	9.20 + a
Roofer: Cole Tar Pitch	33.50	11.35 + a
Roofer: Slate, Tile, Composition, Shingles, Singly Ply and Damp/Waterproofing	32.00	11.35 + a
15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	30.57	24.50

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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)	35.37	19.71
------TRUCK DRIVERS------		
17a) 2 Axle	26.18	12.47 + a
17b) 3 Axle, 2 Axle Ready Mix	26.28	12.47 + a
17c) 3 Axle Ready Mix	26.33	12.47 + a
17d) 4 Axle, Heavy Duty Trailer up to 40 tons	26.38	12.47 + a
17e) 4 Axle Ready Mix	26.43	12.47 + a
17f) Heavy Duty Trailer (40 Tons and Over)	26.63	12.47 + a
17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	26.43	12.47 + a
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	38.35	15.65 + a

As of: **Monday, December 08, 2008**

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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***

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

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.

As of: **Monday, December 08, 2008**

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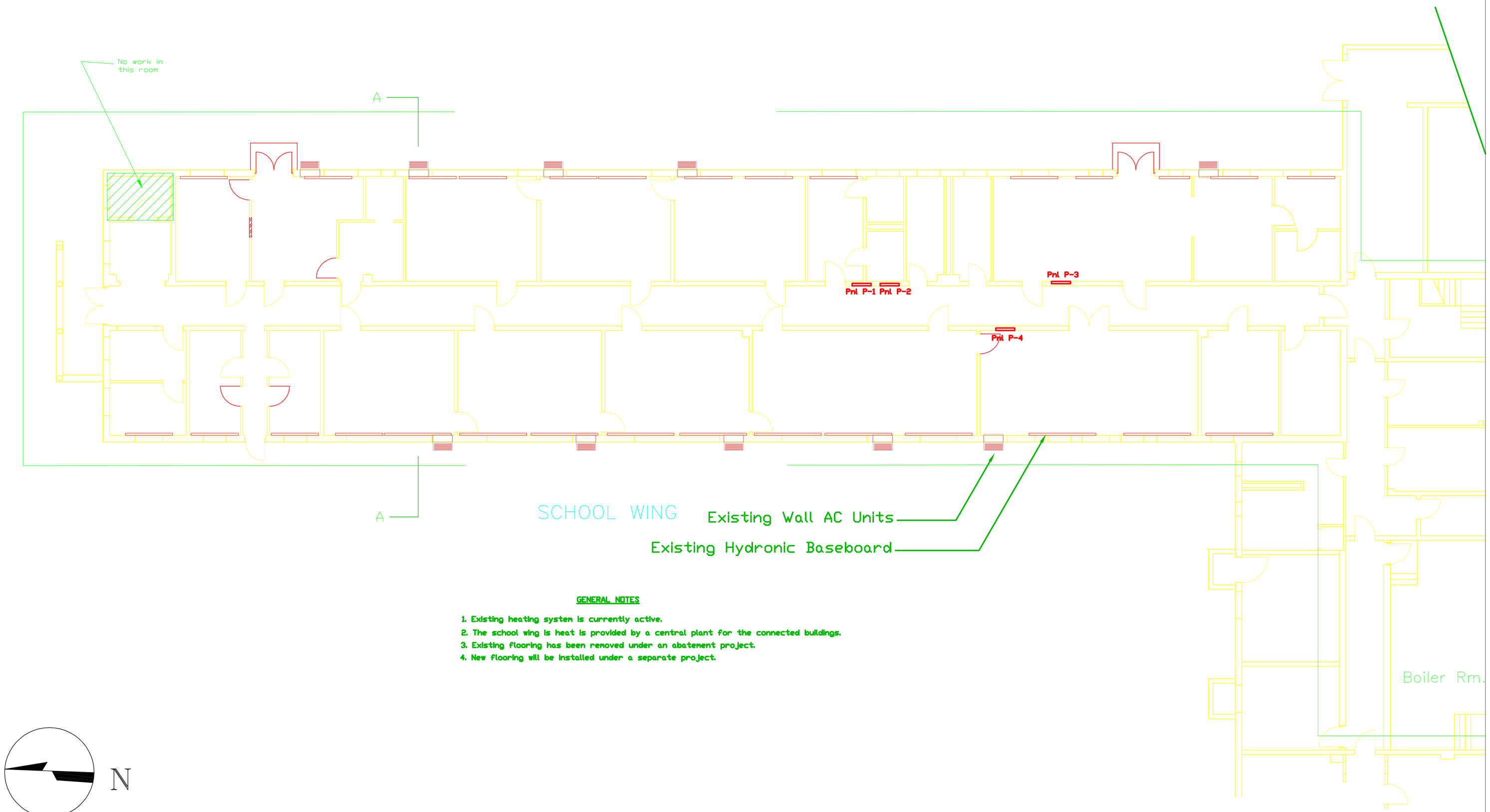
Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

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.

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.

As of: **Monday, December 08, 2008**



GENERAL NOTES

1. Existing heating system is currently active.
2. The school wing is heat is provided by a central plant for the connected buildings.
3. Existing flooring has been removed under an abatement project.
4. New flooring will be installed under a separate project.

N

Department of Children and Families

Engineering

Denise Landry

Chief of Engineering Services

HIGH MEADOWS

825 Hartford Tnpk.

Hamden, CT

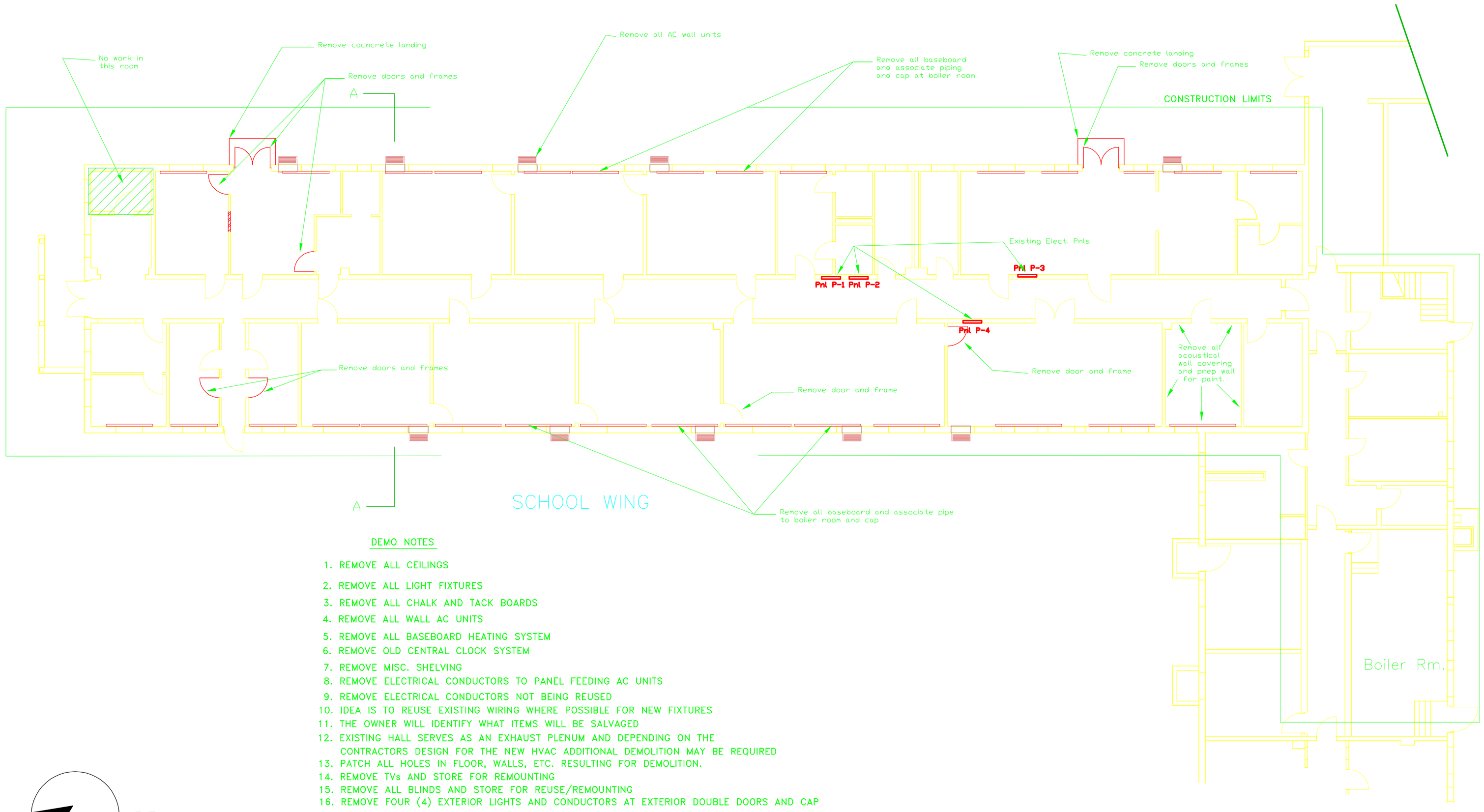
SCHOOL REHAB.

Plant Facitities Engineer

Frank Provenzano

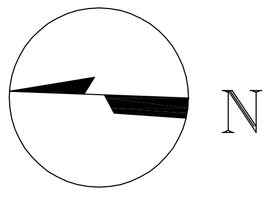
SCALE:	1/4" = 1'-0"
PROJECT NUMBER:	20-HMCF-096
ISSUED:	December 16, 2008
DRAWN BY:	RCG
CHECKED BY:	
FILE NAME:	[illegible]

EXISTING CONDITIONS
SCHOOL BUILDING
A 00.1



DEMO NOTES

1. REMOVE ALL CEILINGS
2. REMOVE ALL LIGHT FIXTURES
3. REMOVE ALL CHALK AND TACK BOARDS
4. REMOVE ALL WALL AC UNITS
5. REMOVE ALL BASEBOARD HEATING SYSTEM
6. REMOVE OLD CENTRAL CLOCK SYSTEM
7. REMOVE MISC. SHELVING
8. REMOVE ELECTRICAL CONDUCTORS TO PANEL FEEDING AC UNITS
9. REMOVE ELECTRICAL CONDUCTORS NOT BEING REUSED
10. IDEA IS TO REUSE EXISTING WIRING WHERE POSSIBLE FOR NEW FIXTURES
11. THE OWNER WILL IDENTIFY WHAT ITEMS WILL BE SALVAGED
12. EXISTING HALL SERVES AS AN EXHAUST PLENUM AND DEPENDING ON THE CONTRACTORS DESIGN FOR THE NEW HVAC ADDITIONAL DEMOLITION MAY BE REQUIRED
13. PATCH ALL HOLES IN FLOOR, WALLS, ETC. RESULTING FOR DEMOLITION.
14. REMOVE TVs AND STORE FOR REMOUNTING
15. REMOVE ALL BLINDS AND STORE FOR REUSE/REMOUNTING
16. REMOVE FOUR (4) EXTERIOR LIGHTS AND CONDUCTORS AT EXTERIOR DOUBLE DOORS AND CAP



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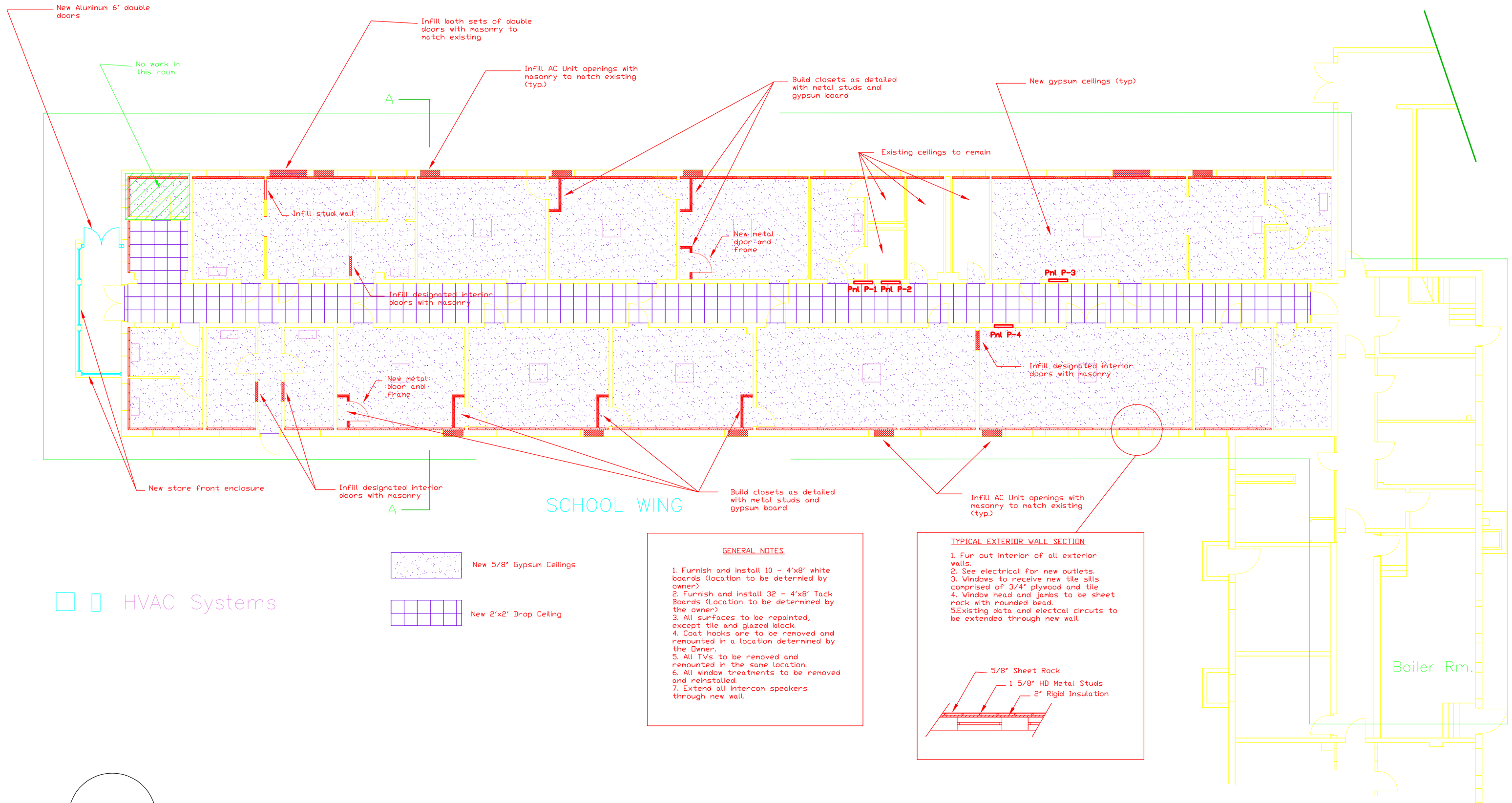
DEMOLITION
SCHOOL BUILDING
D 10.1



HVAC Systems

New 5/8" Gypsum Ceilings

New 2'x2' Drop Ceiling

N

GENERAL NOTES

1. Furnish and install 10 - 4'x8' white boards (location to be determied by owner)
2. Furnish and install 32 - 4'x8' Tack Boards (Location to be determined by the owner)
3. All surfaces to be repainted, except tile and glazed block.
4. Coat hooks are to be removed and remounted in a location determined by the Owner.
5. All TVs to be removed and remounted in the same location.
6. All window treatments to be removed and reinstalled.
7. Extend all intercom speakers through new wall.

TYPICAL EXTERIOR WALL SECTION

1. Fur out interior of all exterior walls.
2. See electrical for new outlets.
3. Windows to receive new tile sills comprised of 3/4" plywood and tile
4. Window head and jambs to be sheet rock with rounded bead.
5.Existing data and electcal circuts to be extended through new wall.

Department of Children and Families

Engineering

Denise Landry

Chief of Engineering Services

HIGH MEADOWS

825 Hartford Tnpk.

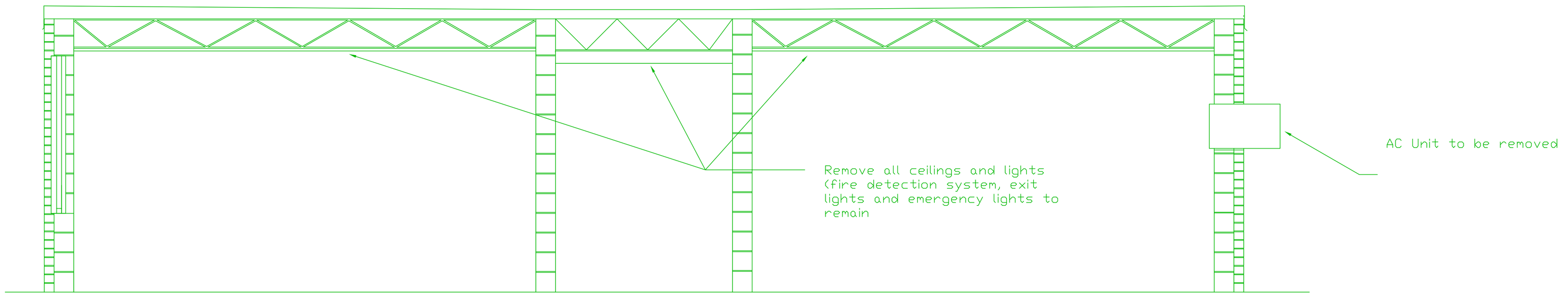
Hamden, CT

SCHOOL REHAB.

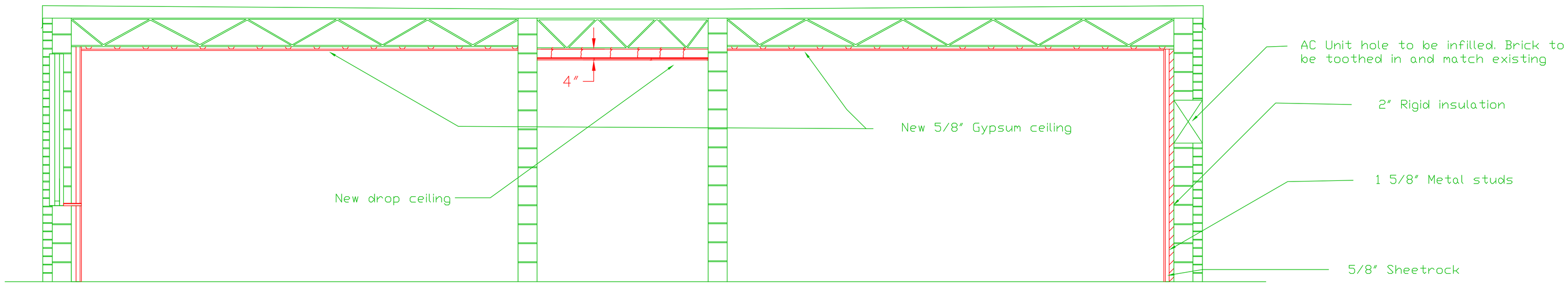
Plant Facitities Engineer
Frank Provenzano

SCALE:	1/4" = 1'-0"
PROJECT NUMBER:	20-HMCF-096
ISSUED:	December 16, 2008
DRAWN BY:	RCG
CHECKED BY:	
FILE NAME:	[illegible]

NEW LAYOUT/WORK
SCHOOL BUILDING
A 10.1



Existing
Section A–A



New
Section A–A

Department
of
Children
and
Families

Engineering
Denise Landry
Chief of Engineering Services

HIGH MEADOWS
825 Hartford Tnpk.
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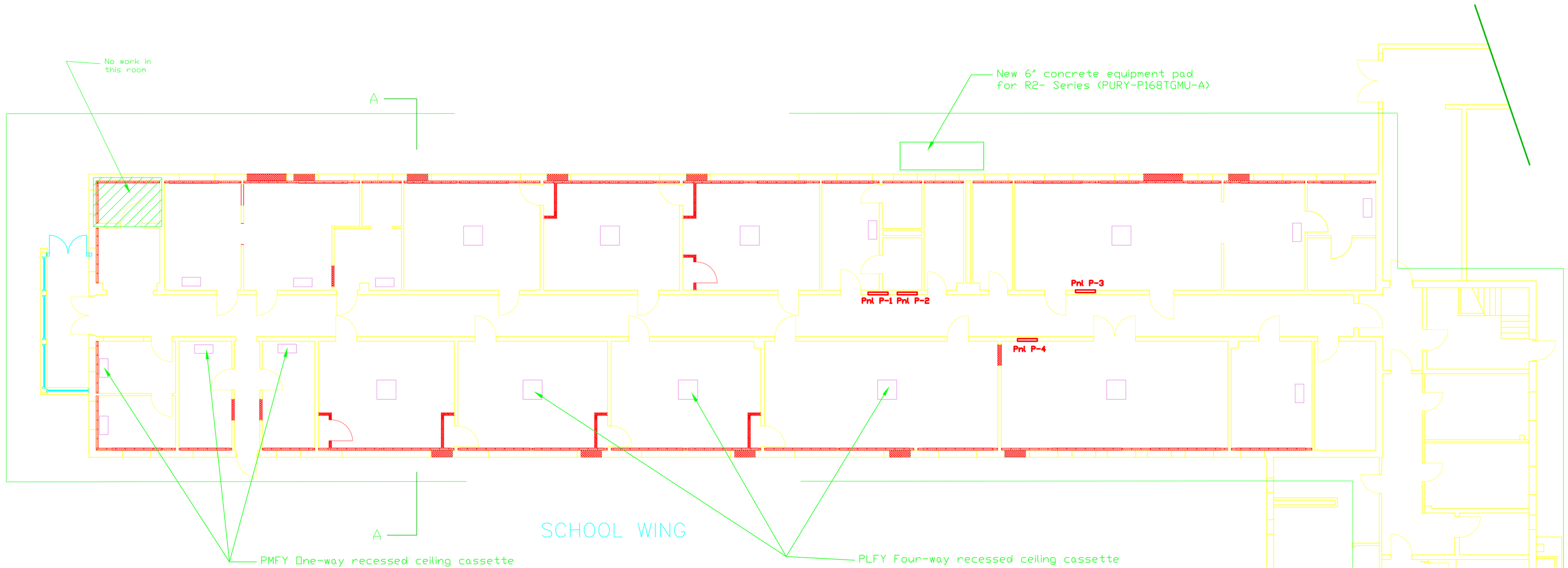
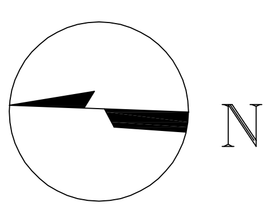
SECTION A–A
SCHOOL BUILDING
A 1.02



HVAC Systems

MECHANICAL NOTES
1. All ceiling cassetes to have fresh air supply
2. Existing school has corridor acting as an exhaust plenum serviced by six exhaust flans. The plan is to utilize these opening to provide two intake fans for ducted fresh air
3. Contractor shall properly size R2 Series for space. Calculations shall be submitted for approval
4. Each room shall be capable of individual control. Rooms shall be controlled by CMCN net work system.
5. System shall be controlled from the maintenance supervisors office
6. Computer shall be provided by the owner.
7. Remote Controllers shall be ME.



Department of Children and Families

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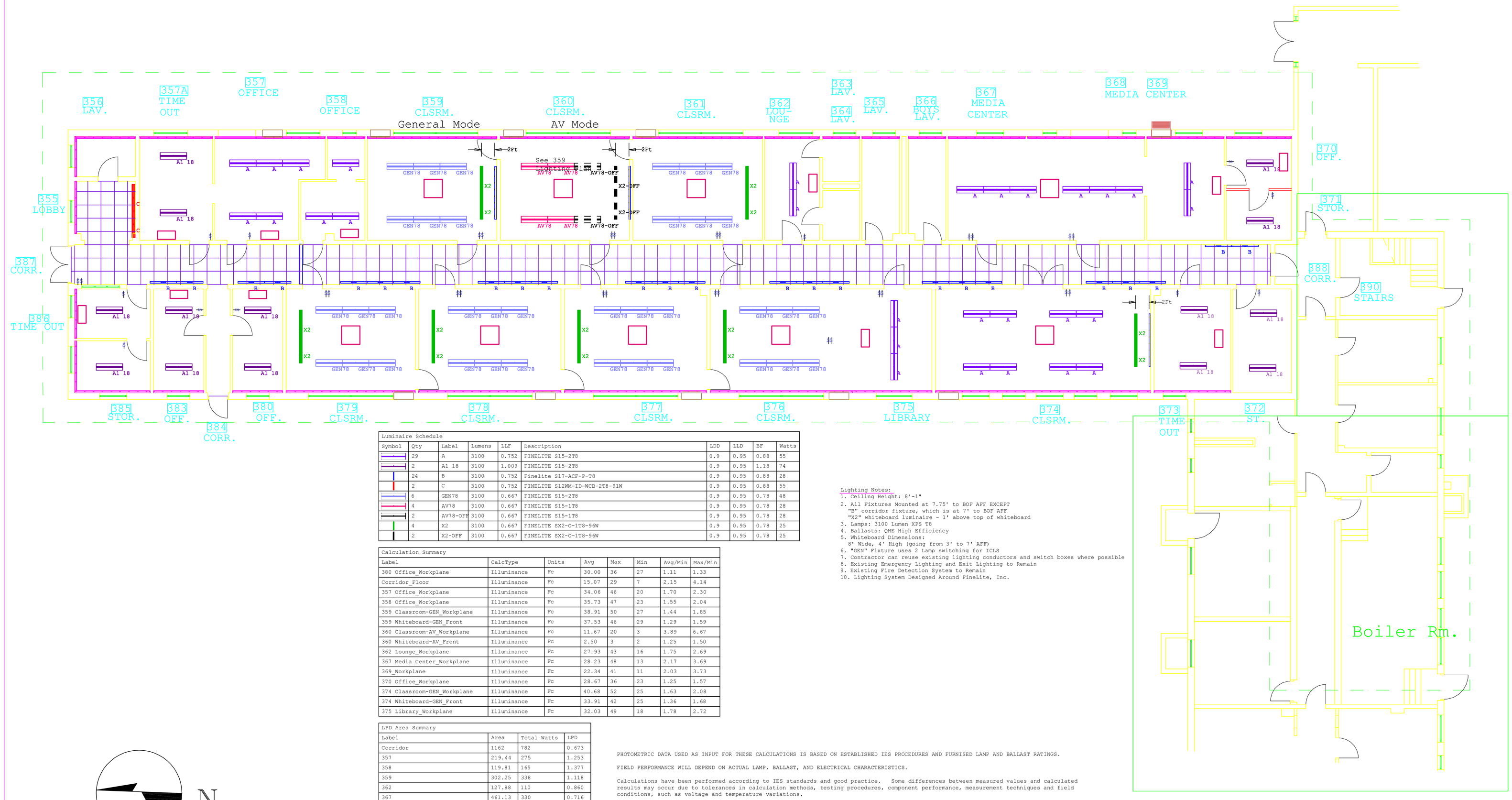
HVAC SYSTEM
SCHOOL BUILDING
M 1.01



Luminaire Schedule									
Symbol	Qty	Label	Lumens	LLF	Description	LDD	LLD	BF	Watts
	29	A	3100	0.752	FINELITE S15-2T8	0.9	0.95	0.88	55
	2	A1 18	3100	1.009	FINELITE S15-2T8	0.9	0.95	1.18	74
	24	B	3100	0.752	Finelite S17-ACF-P-T8	0.9	0.95	0.88	28
	2	C	3100	0.752	FINELITE S12WM-ID-WCB-2T8-91W	0.9	0.95	0.88	55
	6	GEN78	3100	0.667	FINELITE S15-2T8	0.9	0.95	0.78	48
	4	AV78	3100	0.667	FINELITE S15-1T8	0.9	0.95	0.78	28
	2	AV78-OFF	3100	0.667	FINELITE S15-1T8	0.9	0.95	0.78	28
	4	X2	3100	0.667	FINELITE SX2-O-1T8-96W	0.9	0.95	0.78	25
	2	X2-OFF	3100	0.667	FINELITE SX2-O-1T8-96W	0.9	0.95	0.78	25

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
380 Office_Workplane	Illuminance	Fc	30.00	36	27	1.11	1.33
Corridor_Floor	Illuminance	Fc	15.07	29	7	2.15	4.14
357 Office_Workplane	Illuminance	Fc	34.06	46	20	1.70	2.30
358 Office_Workplane	Illuminance	Fc	35.73	47	23	1.55	2.04
359 Classroom-GEN_Workplane	Illuminance	Fc	38.91	50	27	1.44	1.85
359 Whiteboard-GEN_Front	Illuminance	Fc	37.53	46	29	1.29	1.59
360 Classroom-AV_Workplane	Illuminance	Fc	11.67	20	3	3.89	6.67
360 Whiteboard-AV_Front	Illuminance	Fc	2.50	3	2	1.25	1.50
362 Lounge_Workplane	Illuminance	Fc	27.93	43	16	1.75	2.69
367 Media Center_Workplane	Illuminance	Fc	28.23	48	13	2.17	3.69
369_Workplane	Illuminance	Fc	22.34	41	11	2.03	3.73
370 Office_Workplane	Illuminance	Fc	28.67	36	23	1.25	1.57
374 Classroom-GEN_Workplane	Illuminance	Fc	40.68	52	25	1.63	2.08
374 Whiteboard-GEN_Front	Illuminance	Fc	33.91	42	25	1.36	1.68
375 Library_Workplane	Illuminance	Fc	32.03	49	18	1.78	2.72

LPD Area Summary			
Label	Area	Total Watts	LPD
Corridor	1162	782	0.673
357	219.44	275	1.253
358	119.81	165	1.377
359	302.25	338	1.118
362	127.88	110	0.860
367	461.13	330	0.716
369	182.13	110	0.604
370	73.13	74	1.012
374	495.63	490	0.989
375	175.38	165	0.941

Lighting Notes:
1. Ceiling Height: 8'-1"
2. All Fixtures Mounted at 7.75' to BOF AFF EXCEPT
   "B" corridor fixture, which is at 7' to BOF AFF
   "X2" whiteboard luminaire - 1' above top of whiteboard
3. Lamps: 3100 Lumen XP8 T8
4. Ballasts: QHE High Efficiency
5. Whiteboard Dimensions:
   8' Wide, 4' High (going from 3' to 7' AFF)
6. "GEN" Fixture uses 2 Lamp switching for ICLS
7. Contractor can reuse existing lighting conductors and switch boxes where possible
8. Existing Emergency Lighting and Exit Lighting to Remain
9. Existing Fire Detection System to Remain
10. Lighting System Designed Around FineLite, Inc.

PHOTOMETRIC DATA USED AS INPUT FOR THESE CALCULATIONS IS BASED ON ESTABLISHED IES PROCEDURES AND FURNISED LAMP AND BALLAST RATINGS.

FIELD PERFORMANCE WILL DEPEND ON ACTUAL LAMP, BALLAST, AND ELECTRICAL CHARACTERISTICS.

Calculations have been performed according to IES standards and good practice. Some differences between measured values and calculated results may occur due to tolerances in calculation methods, testing procedures, component performance, measurement techniques and field conditions, such as voltage and temperature variations.

HORIZONTAL WORKPLANE VALUES ARE MAINTAINED FOOT-CANDLES AT 30" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE.

AGI32 VERSION 2.0

Calculations by Jennifer Ward, Finelite, Inc
Input data used to generate the attached calculations such as room dimensions, reflectances, furniture and architectural elements, significantly affect the lighting calculations. If the real environment conditions do not match the input date, differences will occur between measured values and calculated values.

N

Department of Children and Families

Engineering
Denise Landry
Chief of Engineering Services

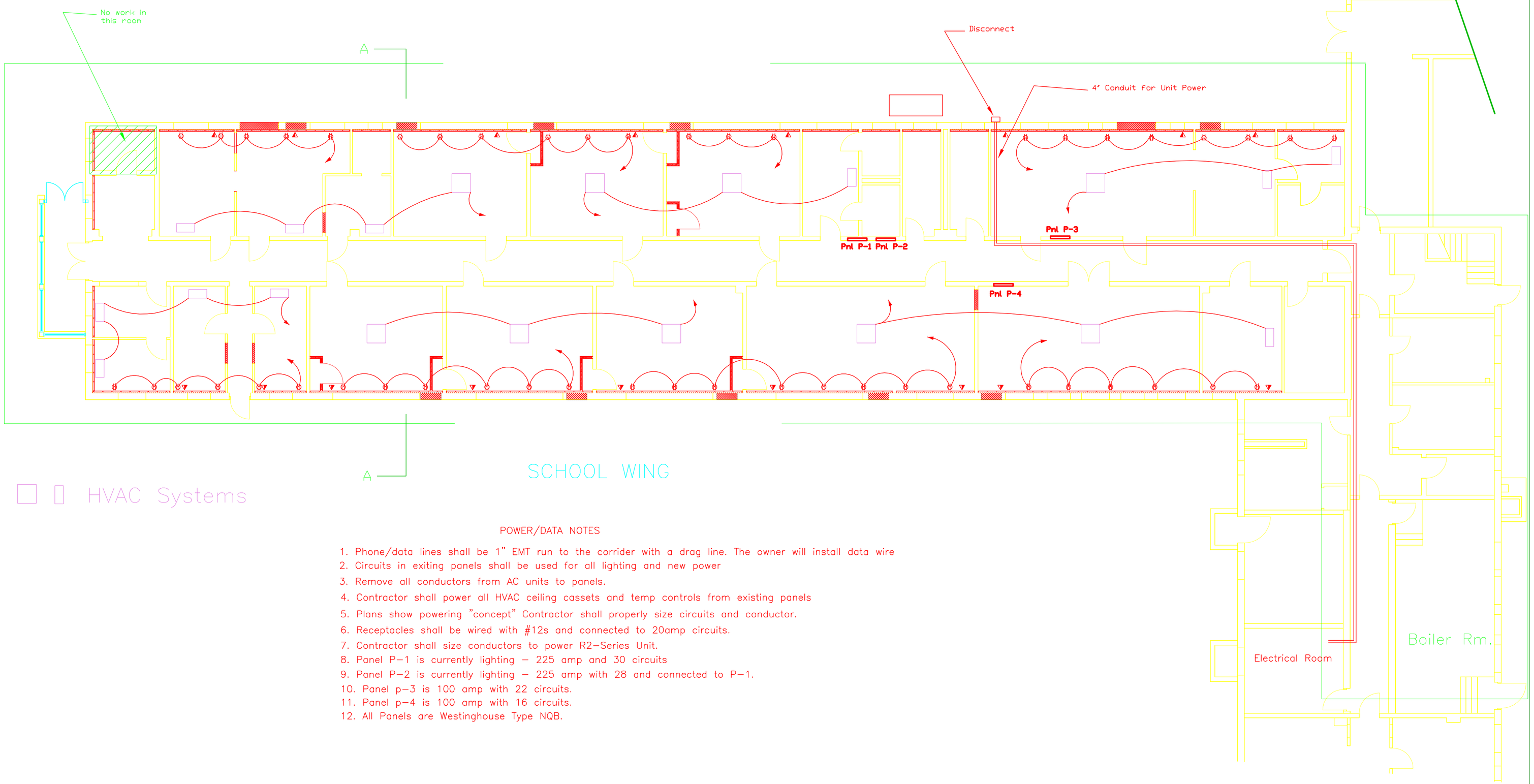
HIGH MEADOWS
825 Hartford Tnpk.
Hamden, CT

SCHOOL REHAB

Plant Facitities Engineer
Frank Provenzano

SCALE:	1/8" = 1'-0"
PROJECT NUMBER:	20-HMCF-096
ISSUED:	December 16, 2008
DRAWN BY:	RCG
CHECKED BY:	
FILE NAME:	M:\Hamden\Architect\High meadows\dwg\Lighting\Lgtn lighting.dwg

LIGHTING PLAN
E .002



POWER/DATA NOTES

1. Phone/data lines shall be 1" EMT run to the corrider with a drag line. The owner will install data wire
2. Circuits in exiting panels shall be used for all lighting and new power
3. Remove all conductors from AC units to panels.
4. Contractor shall power all HVAC ceiling cassets and temp controls from existing panels
5. Plans show powering "concept" Contractor shall properly size circuits and conductor.
6. Receptacles shall be wired with #12s and connected to 20amp circuits.
7. Contractor shall size conductors to power R2-Series Unit.
8. Panel P-1 is currently lighting - 225 amp and 30 circuits
9. Panel P-2 is currently lighting - 225 amp with 28 and connected to P-1.
10. Panel p-3 is 100 amp with 22 circuits.
11. Panel p-4 is 100 amp with 16 circuits.
12. All Panels are Westinghouse Type NQB.

Department of Children and Families

Engineering

Denise Landry

Chief of Engineering Services

HIGH MEADOWS

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SCHOOL REHAB.

Plant Facitities Engineer
Frank Provenzano

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CHECKED BY:	
FILE NAME:	[illegible]

POWER AND DATA
SCHOOL BUILDING
A 1.02

INVATATION TO BID

The Department of Children and Families is accepting sealed bids for:

SCHOOL REHAB
Project Number: 20-HMCF-096
High Meadows, Hamden, CT

Bids must be submitted on the forms supplied and in the manner specified. Complete Bid Documents may are attached to this invitation.

Attendance of a **MANDATORY** pre-bid is required for those interested in submitting proposals. The Pre-Bid is scheduled for **Tuesday, December 16, 2008 at 3:00pm** at High Meadows. 825 Hartford Turnpike, Hamden, CT. Full size drawings and wage rates will be provided at the pre-bid.

Bid is open only to those current in the State's Supplier Diversity Program (Set-Aside Program)

Bids will be accepted at the Department of Children and Families, Engineering Department, 505 Hudson St., Hartford, CT 06106 until **2:00 P.M. local time on MONDAY, ~~JANUARY 5, 2009~~ JANUARY 19, 2009** at which time they will be publicly opened and read.

The Bid, when required, shall be accompanied by the Bidder's financial Statement, as well as a Bid Bond in the amount of ten percent (10%) of the amount bid for any project in excess of $50,000. All bonds required for this Project shall be acceptable to the DCF and as a minimum, issued through a bonding company licensed to transact such business in the State of Connecticut and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the "Treasury Department Circular 570".

The successful Contractor shall be required to provide a Labor and Material Payment Bond and a Performance Bond for one hundred percent (100%) of the Contract price. The right is reserved to reject any or all Bids, in whole or in part, to award any item, group of items, or total Bid, and to waive any informality or technical defects, if it is deemed to be in the best interests of the DCF.

No Bidder may withdraw its Bid within ninety (90) days of the date of the Bid opening. Should there be reasons why the Contract cannot be awarded within the specified period; the time may be extended by mutual agreement between the DCF and the Bidder.

STATE OF CONNECTICUT

DEPARTMENT OF CHILDREN AND FAMILIES

HIGH MEADOWS CHILDRENõS FACILITY

825 HARTFORD TURNPIKE
HAMDEN, CT 06157

SCHOOL REHAB

Project No. 20-HMCF-096 December 1, 2008

PROJECT MANUAL TABLE OF CONTENTS

VOLUME 1 OF 1

DIVISION 16 ELECTRICAL

DRAWING LIST

END OF TABLE OF CONTENTS

INVITATION TO BID

Sealed proposals for the requirements set forth below will be received at the State of Connecticut, Department of Children and Families, Engineering Office, 505 Hudson Street, Hartford, CT 06106, until **Monday, ~~January 5, 2009~~ January 19, 2009, 2:00PM**, and will be publicly open and read immediately thereafter in the Engineering Department, tabulated, and results made available immediately.

This Project consists of the reconstruction construction of approximately 7500 square feet of the facilities school. This work includes the design/build of a new HVAC system using the Mitsubishi City Multi VRFZ Technology. The Contractor shall be responsible for properly sizing the system to heat and cool the space. Special out lets will be installed to supplement the systems heat on cold days. Fresh air supplies will be connected to the individual room units per code.

The existing building is concrete block with an exterior brick façade. Exterior walls will be insulated, metal studs installed and sheet rocked. All interior walls will be painted. Existing ceilings and lights shall be removed and new ceilings and lights installed. Existing hydronic heating system shall be removed and all copper turned over to the owner.
Some of the Project requirements are:

- New drop and gypsum ceilings
- Some new electrical
- New lights
- Painting all surfaces
- Some masonry in-fills
- Insulate and build out exterior walls

The bidder shall review the plans and specifications for complete project details.

A mandatory pre bid conference will be held on Tuesday, December 16, 2008 at 3:00PM at High Meadows Facility, 825 Hartford Tpk., Hamden, CT 06450.

Bid shall be submitted on the specified form furnished with the set of bid documents. Each bid shall be accompanied by a bid bond (10% of the price) that shall meet the requirements of the local, state and federal rules, laws, and regulations. **(NOTE: Only if the project exceeds $50,000 dollars)**

The State of Connecticut, Department of Children and Families reserves the right to waive informalities and to accept or reject any and all or parts of any and all bids.

No bids may be withdrawn for at least 60 days after the scheduled closing times for receipt of bids.

INSTRUCTION TO BIDDERS AND CONDITIONS OF BID

SEALED BIDS

Bids must be submitted in a sealed envelope, clearly marked with the appropriate project number, date, time of bid opening, and name and address of the bidder. All pages of this Invitation & Bid Form must be submitted with your bid. Telegraphic, telephonic, faxed and emailed bids will not be accepted under any circumstances.

SUBMISSION OF BIDS

Bids may be mailed, or delivered in person to the following address to arrive by the bid closing date and time. Late bids will note be accepted and will be returned to the bidder unopened. Extensions will not be granted.

Richard Grossman, Engineering Dept
Department of Children and Families
505 Hudson Street
Hartford, CT 06106

PRE-BID MEETING

A mandatory pre-bid meeting will be held on-site **Tuesday, December 16, 2008, 3:00PM**. The meeting will be at the High Meadows Childrenôs Facility, 825 Hartford Tpk., Hamden, CT. All Contractors proposing for this project are required to visit and examine the site before proposing, and to verify the job conditions and dimensions. Pre-Bid Meeting late arrivals will **NOT** be permitted. Late arrivals are defined as 15 minutes past the time stated above. Any one arriving late will **NOT** be given credit for attendance nor allowed to participate in the BID process. This meeting is intended to review the Bid requirements and answer any questions that interest the bidders may have about this Bid. Failure to attend this meeting will result in the rejection of your Bid.

BID CLOSING DATE

Bids must be received and stamped into Mr. Grossmanôs office no later than **Monday, ~~January 5, 2009~~, January 19, 2009 2:00PM** at the location indicated above. All bids will be opened at the stipulated time and place. Any bidder who wishes to attend may do so.

STATES RIGHTS

The State reserves the right to reject any and all bids, and to waive any informality in the bids. No bids may be withdrawn for at least 60 days after the scheduled closing times for receipt of bids.

STANDARD CONDITIONS

1. Bid Security ï Bid security in the form of a certified check, bank check, or bid bond in the amount equal to 10% of the bid is required on all bids in excess of $50,000.00. Checks should be made payable to:

   Treasure, State of Connecticut

2. Security for faithful performance ï Performance Bond and Labor and Material Bond in the amount of 100% of the purchase order price must be filed by the successful low bidder prior to the start of construction if the bid is in excess of $50,000.00.

3. Personal liability and property damage insurance is required per the Certificate of Insurance included herein.

4. Contractor shall commence work within eleven days after receiving notice to begin work and continue to completion of the project, unless otherwise specified or agreed.

5. Contact Persons: Frank Provenzano, Plant Facility Engineer, 203-218-8378; Fax 203-281-8372

6. Liquidated Damages: $350.00 per day.

SUPPLEMENTAL BIDS

Occasionally, the State may request ñSupplemental Bidsò to a special project. When listed on the Invitation and Bid Form, each bidder is required to bid on each Supplement Bid.

CONNECTICUT SALES AND USE TAX

All contractors shall familiarize themselves with the current regulations of the Department of Revenue Service. The tax on materials or supplies exempted by such regulations shall not be included as part of the Contractorôs bid.

DISCREPANCY IN AMOUNTS

In the event of any discrepancy between the amount written in words and the amount written in numerical figures, the amount written in words will be controlling. In case of error in the extension of prices in the bid, the unit price will govern.

START AND COMPLETION DATES

All work is to be completed within the specified number of days from the starting date, which is to be established at the time the Contract is awarded.

SUBLETTING OR ASSIGNING OF CONTACT

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.

No person, firm, corporation other than the contractor to whom the project was awarded, shall be permitted to commence work at the site of the project until such consent has been granted.

END OF SECTION

BID PROPOSAL FORM

TO: Richard Grossman, Engineering Dept.
Department of Children and Families
505 Hudson Street
Hartford, CT 06106

FOR: School Rehab
High Meadows
825 Hartford Tpk.
Hamden, CT 06157
Project: 20-HMCF-096

DATE: _____

FROM: _____

_____

_____

In compliance with the Instructions to Bidders and Conditions of Bid; and subject to all conditions thereof, the undersigned offers and agrees to furnish the labor and materials and to complete work called for by the projectôs plans and specifications within the allotted time (150 Calendar days) for the Lump Sum of:

The Proposed Contract Base Bid Price (Sum of base price plus unit price):

WORDS _____ DOLLARS

Figures:($ _____)

Unit Price Allowance:

(none)

This Bid Proposal includes _____ number of **Addenda.**

The Contractor is to fill in the above space acknowledging the number of Addenda that the Contractor is including in the Bid Proposal Form.

Award will be made on the lowest responsible bidder for the BASE BID price.

The General Contractor on this project will be required to perform not less than (50%) of the completed dollar value of the work with its own forces.

I (we), the undersigned, hereby declare that I am (we are) the only person(s) interested in this proposal: That it is made without any connection with any other person making any bid for the same work: that no person acting for, or employed by, the State of Connecticut is directly or indirectly interested in this proposal, or in any contract which may be under it, or in expected profits to arise there from: that this proposal is made without directly or indirectly influencing or attempting to influence any other person or corporation to bid or to refrain from bidding or to influence the amount of the bid of any other person or corporation: that this proposal is made in good faith without collusion or connection with any other person bidding for the same work; and that 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 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.

Contractor (Owner/Officer): _____

Date: _____

Title: _____

Address: _____

City, State, Zip: _____

(AFFIX CORPORATE SEAL)

END OF SECTION ï BID FORM

DEPARTMENT OF CHILDREN AND FAMILIES
STATE OF CONNIECTICUT

STANDARD BID BOND

KNOW ALL MEN BY THESE PRESENTS, That we, _____

_____ , hereinafter called the Principal,

of _____ , as Principal,

and _____ , hereinafter called the Surety, a corporation organized and existing under the laws of the State of

_____ , and duly authorized to transact a surety business in the State of Connecticut, as Surety, are held and firmly bound unto the State of Connecticut, as Obligee, in the penal sum of ten (10) percent of the amount of the bid set forth in a

proposal hereinafter mentioned, _____

_____ ,
lawful money of the United States of America, for the payment of which, well and truly to be made to the Obligee, the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, That, whereas the Principal has submitted or is about to submit a proposal to the Obligee related to a contract for Project No.: 20-HMCF-096

NOW, THEREFORE, if the said contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the said contract in writing with the State of Connecticut and give the required bonds, with surety acceptable to the Obligee, or if the Principal shall fail to do so, pay to the Obligee the damages which the Obligee may suffer by reason of such failure not exceeding the penalty of this bond, then this obligation shall be void, otherwise to remain in full force and effect.

SIGNED, SEALED AND DELIVERED this _____day of _____ , 20 _____

_____		_____
Principalsô Signature		Surety
_____	by	_____
(Print Name)		Its attorney in fact
_____		_____
Company Name		(Print Name)

EXECUTIVE ORDERS:

This contract is subject the provisions of Executive Order No. Three of Governor Thomas J Meskill, promulgated June 16, 1971, concerning labor employment practices; to Section 6 and 10 of Executive Order No. 7B of Governor M. Jodi Rell, promulgated November 16, 2005, concerning contracting reforms; Executive Order No. Sixteen of Governor John G. Rowland, promulgated August 4, 1999, concerning violence in the workplace, all of which are incorporated into, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings; and are made a part of this contract.

COMMISSION ON HUMAN RIGHTS AND OPPORTUNITIES
CONTRACT COMPLIANCE REGULATIONS
NOTIFICATION TO BIDDERS

The contract to be awarded is subject to contract compliance requirements mandated by Sections 4a-60 and 4a-60a of the Connecticut General Statutes; and, when the awarding agency is the State, Sections 46a-71(d) and 46a-81i(d) of the Connecticut General Statutes. There are Contract Compliance Regulations codified at Section 46a-68j-21 through 43 of the Regulations of Connecticut State Agencies, which establish a procedure for awarding all contracts covered by Sections 4a-60 and 46a-71(d) of the Connecticut General Statutes.

According to Section 46a-68j-30(9) of the Contract Compliance Regulations, 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 Section 4a-60 of the Connecticut General Statutes as a business wherein fifty-one percent or more of the capital stock, or assets belong to a person or persons: "(1) Who are active in 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." "Minority" groups are defined in Section 32-9n of the Connecticut General Statutes as "(1) Black Americans . . . (2) Hispanic Americans . . . (3) persons who have origins in the Iberian Peninsula . . . (4)Women . . . (5) Asian Pacific Americans and Pacific Islanders; (6) American Indians . . ." An individual with a disability is also a minority business enterprise as provided by Section 4a-60g of the Connecticut General Statutes. The above definitions apply to the contract compliance requirements by virtue of Section 46a-68j-21(11) of the Contract Compliance Regulations.

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

(a) the bidder's success in implementing an affirmative action plan;
(b) the bidder's success in developing an apprenticeship program complying with Sections 46a-68-1 to 46a-68-17 of the Administrative Regulations of Connecticut State Agencies, inclusive;
(c) the bidder's promise to develop and implement a successful affirmative action plan;
(d) 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
(e) the bidder's promise to set aside a portion of the contract for legitimate minority business enterprises. See Section 46a-68j-30(10)(E) of the Contract Compliance Regulations.

INSTRUCTIONS AND OTHER INFORMATION

The following BIDDER CONTRACT COMPLIANCE MONITORING REPORT must be completed in full, signed, and submitted with the bid for this contract. The contract awarding agency and the Commission on Human Rights and Opportunities will use the information contained thereon to determine the bidders compliance to Sections 4a-60 and 4a-60a CONN. GEN. STAT., and Sections 46a-68j-23 of the Regulations of Connecticut State Agencies regarding equal employment opportunity, and the bidders good faith efforts to include minority business enterprises as subcontractors and suppliers for the work of the contract.

1) Definition of Small Contractor

Section 4a-60g CONN. GEN. STAT. defines a small contractor as a company that has been doing business under the same management and control and has maintained its principal place of business in Connecticut for a one year period immediately prior to its application for certification under this section, had gross revenues not exceeding ten million dollars in the most recently completed fiscal year, and at least fifty-one percent of the ownership of which is held by a person or persons who are active in the daily affairs of the company, and have the power to direct the management and policies of the company, except that a nonprofit corporation shall be construed to be a small contractor if such nonprofit corporation meets the requirements of subparagraphs (A) and (B) of subdivision 4a-60g CONN. GEN. STAT.

2) Description of Job Categories (as used in Part IV Bidder Employment Information) (Page 2)

MANAGEMENT: Managers plan, organize, direct, and control the major functions of an organization through subordinates who are at the managerial or supervisory level. They make policy decisions and set objectives for the company or departments. They are not usually directly involved in production or providing services. Examples include top executives, public relations managers, managers of operations specialties (such as financial, human resources, or purchasing managers), and construction and engineering managers.

BUSINESS AND FINANCIAL OPERATIONS: These occupations include managers and professionals who work with the financial aspects of the business. These occupations include accountants and auditors, purchasing agents, management analysts, labor relations specialists, and budget, credit, and financial analysts.

COMPUTER SPECIALISTS: Professionals responsible for the computer operations within a company are grouped in this category. Examples of job titles in this category include computer programmers, software engineers, database administrators, computer scientists, systems analysts, and computer support specialists

ARCHITECTURE AND ENGINEERING: Occupations related to architecture, surveying, engineering, and drafting are included in this category. Some of the job titles in this category include electrical and electronic engineers, surveyors, architects, drafters, mechanical engineers, materials engineers, mapping technicians, and civil engineers.

OFFICE AND ADMINISTRATIVE SUPPORT: All clerical-type work is included in this category. These jobs involve the preparing, transcribing, and preserving of written communications and records; collecting accounts; gathering and distributing information; operating office machines and electronic data processing equipment; and distributing mail. Job titles listed in this category include telephone operators, payroll clerks, bill and account collectors, customer service representatives, files clerks, dispatchers, shipping clerks, secretaries and administrative assistants, computer operators, mail clerks, and stock clerks.

BUILDING AND GROUNDS CLEANING AND MAINTENANCE: This category includes occupations involving landscaping, housekeeping, and janitorial services. Job titles found in this category include supervisors of landscaping or housekeeping, janitors, maids, grounds maintenance workers, and pest control workers.

CONSTRUCTION AND EXTRACTION: This category includes construction trades and related occupations. Job titles found in this category include boilermakers, masons (all types), carpenters, construction laborers, electricians, plumbers (and related trades), roofers, sheet metal workers, elevator installers, hazardous materials removal workers, paperhangers, and painters. Paving, surfacing, and tamping equipment operators; drywall and ceiling tile installers; and carpet, floor and tile installers and finishers are also included in this category. First line supervisors, foremen, and helpers in these trades are also grouped in this category..

INSTALLATION, MAINTENANCE AND REPAIR: Occupations involving the installation, maintenance, and repair of equipment are included in this group. Examples of job titles found here are heating, ac, and refrigeration mechanics and installers; telecommunication line installers and repairers; heavy vehicle and mobile equipment service technicians and mechanics; small engine mechanics; security and fire alarm systems installers; electric/electronic repair, industrial, utility and transportation equipment; millwrights; riggers; and manufactured building and mobile home installers. First line supervisors, foremen, and helpers for these jobs are also included in the category.

MATERIAL MOVING WORKERS: The job titles included in this group are Crane and tower operators; dredge, excavating, and lading machine operators; hoist and winch operators; industrial truck and tractor operators; cleaners of vehicles and equipment; laborers and freight, stock, and material movers, hand; machine feeders and offbearers; packers and packagers, hand; pumping station operators; refuse and recyclable material collectors; and miscellaneous material moving workers.

3) Definition of Racial and Ethnic Terms (as used in Part IV Bidder Employment Information)

White (not of Hispanic Origin)- All persons having origins in any of the original peoples of Europe, North Africa, or the Middle East.

Black(not of Hispanic Origin)- All persons having origins in any of the Black racial groups of Africa.

Hispanic- All persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race.

Asian or Pacific Islander- All persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands. This area includes China, India, Japan, Korea, the Philippine Islands, and Samoa.

American Indian or Alaskan Native- All persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.

BIDDER CONTRACT COMPLIANCE MONITORING REPORT

PART I - Bidder Information

Company Name Street Address City & State Chief Executive	Bidder Federal Employer Identification Number_____ Or Social Security Number_____
Major Business Activity (brief description)	Bidder Identification (response optional/definitions on page 1) -Bidder is a small contractor. Yes__ No__ -Bidder is a minority business enterprise Yes__ No__ (If yes, check ownership category) Black___ Hispanic___ Asian American___ American Indian/Alaskan Native___ Iberian Peninsula___ Individual(s) with a Physical Disability___ Female___
Bidder Parent Company (If any)	- Bidder is certified as above by State of CT Yes__ No__
Other Locations in Ct. (If any)	- DAS Certification Number _____

PART II - Bidder Nondiscrimination Policies and Procedures

1. Does your company have a written Affirmative Action/Equal Employment Opportunity statement posted on company bulletin boards? Yes__ No__	7. Do all of your company contracts and purchase orders contain non-discrimination statements as required by Sections 4a-60 & 4a-60a Conn. Gen. Stat.? Yes__ No__
2. Does your company have the state-mandated sexual harassment prevention in the workplace policy posted on company bulletin boards? Yes__ No__	8. Do you, upon request, provide reasonable accommodation to employees, or applicants for employment, who have physical or mental disability? Yes__ No__
3. Do you notify all recruitment sources in writing of your company's Affirmative Action/Equal Employment Opportunity employment policy? Yes__ No__	9. Does your company have a mandatory retirement age for all employees? Yes__ No__
4. Do your company advertisements contain a written statement that you are an Affirmative Action/Equal Opportunity Employer? Yes__ No__	10. If your company has 50 or more employees, have you provided at least two (2) hours of sexual harassment training to all of your supervisors? Yes__ No__ NA__
5. Do you notify the Ct. State Employment Service of all employment openings with your company? Yes__ No__	11. If your company has apprenticeship programs, do they meet the Affirmative Action/Equal Employment Opportunity requirements of the apprenticeship standards of the Ct. Dept. of Labor? Yes__ No__ NA__
6. Does your company have a collective bargaining agreement with workers? Yes__ No__ 6a. If yes, do the collective bargaining agreements contain non-discrimination clauses covering all workers? Yes__ No__ 6b. Have you notified each union in writing of your commitments under the nondiscrimination requirements of contracts with the state of Ct? Yes__ No__	12. Does your company have a written affirmative action Plan? Yes__ No__ If no, please explain. 13. Is there a person in your company who is responsible for equal employment opportunity? Yes__ No__ If yes, give name and phone number. _____ _____

Part III - Bidder Subcontracting Practices

1. Will the work of this contract include subcontractors or suppliers? Yes__ No__

1a. If yes, please list all subcontractors and suppliers and report if they are a small contractor and/or a minority business enterprise. (defined on page 1 / use additional sheet if necessary)

1b. Will the work of this contract require additional subcontractors or suppliers other than those identified in 1a. above? Yes__ No__

PLEASE COMPLETE REVERSE SIDE

PART IV - Bidder Employment Information Date: (Page 4)

JOB CATEGORY	OVERALL TOTALS	WHITE (not of Hispanic origin)		BLACK (not of Hispanic origin)		HISPANIC		ASIAN or PACIFIC ISLANDER		AMERICAN INDIAN or ALASKAN NATIVE	
		Male	Female	Male	Female	Male	Female	Male	Female	male	female
Management											
Business & Financial Ops											
Computer Specialists											
Architecture/Engineering											
Office & Admin Support											
Bldg/ Grounds Cleaning/Maintenance											
Construction & Extraction											
Installation , Maintenance & Repair											
Material Moving Workers											
TOTALS ABOVE											
Total One Year Ago											
FORMAL ON THE JOB TRAINEES (ENTER FIGURES FOR THE SAME CATEGORIES AS ARE SHOWN ABOVE)											
Apprentices											
Trainees											

PART V - Bidder Hiring and Recruitment Practices

1. Which of the following recruitment sources are used by you? (Check yes or no, and report percent used)

SOURCE	YES	NO	% of applicants provided by source
State Employment Service			
Private Employment Agencies			
Schools and Colleges			
Newspaper Advertisement			
Walk Ins			
Present Employees			
Labor Organizations			
Minority/Community Organizations			
Others (please identify)			

2. Check (X) any of the below listed requirements that you use as a hiring qualification

(X)	
	Work Experience
	Ability to Speak or Write English
	Written Tests
	High School Diploma
	College Degree
	Union Membership
	Personal Recommendation
	Height or Weight
	Car Ownership
	Arrest Record
	Wage Garnishments

3. Describe below any other practices or actions that you take which show that you hire, train, and promote employees without discrimination

Certification (Read this form and check your statements on it CAREFULLY before signing). I certify that the statements made by me on this BIDDER CONTRACT COMPLIANCE MONITORING REPORT are complete and true to the best of my knowledge and belief, and are made in good faith. I understand that if I knowingly make any misstatements of facts, I am subject to be declared in non-compliance with Section 4a-60, 4a-60a, and related sections of the CONN. GEN. STAT.

(Signature)	(Title)	(Date Signed)	(Telephone)

Affidavit for Certification of Subcontractors as Minority Business Enterprises (MBE)

(to be completed only for subcontractors not certified as MBE's by the Department of Administrative Services)

To document the Agood faith efforts@ of the below named state contractor to include minority business enterprises as subcontractors (for services and/or material suppliers) on the state contract also identified below, I certify that the following subcontractors meet the criteria for minority business enterprises set forth in CONN. GEN. STAT. § 4a-60(b). I attest that each named minority business enterprise will be contracted by the named state contractor to participate on the identified state contract as a subcontractor.

The subcontractors being identified to be bona fide minority business enterprises are:

Subcontractor Name	Complete Address	Subcontractor's Principal Officer's Name

(use additional sheets as necessary)

I further certify and affirm that I have read and understand the contract compliance requirements codified at CONN. GEN. STAT. Sections 4a-60 & 46a-71(d), and the Contract Compliance Regulations codified at Sections 46a-68j-21 through 43 of the Administrative Regulations of Connecticut State Agencies. I also understand that any false statements made herein are punishable by law.

_____ _____

state contractor legal name

type full printed name and title of official submitting this affidavit on behalf of contractor

_____ _____

state contract number

signature of official

_____ _____

state contract awarding agency

date of affidavit

Subscribed and sworn to before me, this_____ day of _____ 20_____

_____

Notary Public/Commissioner of the Superior Court

My Commission expires_____

STATE OF CONNECTICUT
COMMISSION ON HUMAN RIGHTS AND OPPORTUNITIES

NOTICE CONCERNING CONTRACT COMPLIANCE RESPONSIBILITIES

TO ALL LABOR UNIONS, WORKER=S REPRESENTATIVES AND VENDORS:

Any contract this contractor has with the State of Connecticut or political subdivisions of the state other than municipalities shall be performed in accordance with CONN. GEN. STAT. Section 4a-60 and Section 4a-60a.

This means that this contractor:

1. Agrees to provide the Commission on Human Rights and Opportunities (CHRO) with any information concerning this contractor=s employment practices and procedures which relates to our responsibilities under CONN. GEN. STAT. Sections 4a-60 or 46a-56 or Section 4a-60a.; and

2. Agrees to include the provisions of CONN. GEN. STAT. Section 46a-60(a) and Section 4a-60a in each and every subcontract and purchase order and to take whatever action the CHRO deems necessary to enforce these provisions.

WITH REGARD TO RACE, COLOR, RELIGIOUS CREED, AGE, MARITAL STATUS, NATIONAL ORIGIN, ANCESTRY, SEX, MENTAL RETARDATION OR PHYSICAL DISABILITY, this means that this contractor:

1. Shall not discriminate or permit discrimination against anyone;

2. Shall take affirmative action so that persons applying for employment are hired on the basis of job-related qualifications and that employees once hired are treated without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, mental retardation or physical disability, unless the contractor can show that the disability prevents performance of the work involved;

3. Shall state in all advertisements for employees that it is an Aaffirmative action-equal opportunity employer@;

4. Shall comply with CONN. GEN. STAT. Sections 4a-60, 46a-68e and 46a-68f and with each regulation or relevant order issued by the CHRO under CONN. GEN. STAT. Sections 46a-56, 46a-68e and 46a-68f; and

5. Shall make, if the contract is a public works contract, good faith efforts to employ minority business enterprises as subcontractors and suppliers of materials.

WITH REGARD TO SEXUAL ORIENTATION, WHICH INCLUDES HOMOSEXUALITY, BISEXUALITY AND HETEROSEXUALITY:

1. The contractor will not discriminate or permit discrimination against anyone, and employees will be treated without regard to their sexual orientation once employed; and

2. The contractor agrees to fully comply with Section 4a-60a and each regulation or relevant order issued by the CHRO under CONN. GEN. STAT. Section 46a-56.

Persons having questions about this notice or their rights under the law are urged to contact the:

COMMISSION ON HUMAN RIGHTS AND OPPORTUNITIES
DIVISION OF AFFIRMATIVE ACTION, MONITORING & CONTRACT COMPLIANCE

21 Grand Street
Hartford, Connecticut 06106
(860) 541-3400

COPIES OF THIS NOTICE SHALL BE POSTED IN CONSPICUOUS PLACES
AVAILABLE TO ALL EMPLOYEES AND APPLICANTS FOR EMPLOYMENT

Connecticut General Statute Section 31-53
Summary of Connecticut's Prevailing Wage Law

Connecticutôs prevailing wage law is codified in Connecticut General Statutes Section 31-53 and 31-53a. The law applies to each contract for the construction, remodeling, refinishng, refurbishing, rehabilitation, alteration or repair of any public works project by the State or its agents, or by any political subdivision of the State.

Coverage
Conn. Gen. Stat. Section 31-53(g) provides monetary thresholds which must be met before the law is applicable. The prevailing wage law does not apply where the **total cost of all work to be performed by all contractors and subcontractors** in connection with new construction of a public works project is less than four hundred thousand ($400,000) dollars. The prevailing wages law does not apply in connection with remodeling, refinishng, refurbishing, rehabilitation, alteration or repair of any public works project under one hundred thousand ($100,000) dollars.

Prevailing Rate
The prevailing rate consists of a base rate and a fringe benefit rate which may be paid in cash or benefits. Conn. Gen. Stat. Section 31-53(d) permits the Labor Commissioner to adopt and use the prevailing wage rate determinations as have been made by the Secretary of Labor of the United States under the provisions of the Davis-Bacon Act, as amended. **The agent empowered to let such contract shall contact the Labor Commissioner at least ten, but not more than twenty days, prior to the date such contracts will be advertised for bid, to ascertain the proper prevailing rate. Under Public Act 02-69 the rates will be adjusted annually on or before July 1st of each year. These new rates will be on Department of Labor website.**

Certifications
Both the Contractor and the Contracting Agent must provide certifications to the Labor Commissioner. Prior to the award of any contract subject to the prevailing wage law, the contracting agent shall certify in writing to the Labor Commissioner the total dollar amount of work to be done in connection with the public works project, regardless of whether such project consists of one or more contracts. Upon the award of a contract subject to the prevailing wage law, the contractor who is awarded the contract shall also certify, under oath, to the Labor Commissioner the pay scale to be used by the contractor and any of his subcontractors for the work to be performed under the contract. Additionally, each employer subject to the prevailing wage law must file certified payrolls with the contracting agent including information, including but not limited to, employee names; occupations; hours worked; rates paid; and the employers compliance with various provisions of law.

Penalties

There are various civil, criminal and administrative penalties for violations of the prevailing wage law. Failure to pay the prevailing rate is a crime which may be a felony depending upon the amount of unpaid wages. Knowingly filing a false certified payroll or failure to file a certified payroll is a Class D felony for which an employer may be fined up to five thousand dollars, imprisoned for up to five years, or both. Disregarding obligations under Conn. Gen. Stat. Section 31-53 may result in an administrative debarment which may preclude any firm, corporation, partnership or association in which such person or firms have an interest from receiving an award of a contract until a period of up to three years have elapsed. Additionally, civil penalties of $300 per violation of law may also be assessed upon the employer.

For additional information contact:
Wage and Workplace Standards Division
Public Contract Compliance (860) 263-6790

ACORD™ CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

INSURERS AFFORDING COVERAGE	NAIC #
INSURER A:	
INSURER B:	
INSURER C:	
INSURER D:	
INSURER E:	

INSURED

COVERAGES

THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. AGGREGATE LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	ADD'L INSRD	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	LIMITS	
		GENERAL LIABILITY				EACH OCCURRENCE	$ 1,000,000
		X COMMERCIAL GENERAL LIABILITY				DAMAGE TO RENTED PREMISES (Ea occurence)	$
		CLAIMS MADE [X] OCCUR				MED EXP (Any one person)	$ 10,000
		X Owner's & Contractor's Prot.				PERSONAL & ADV INJURY	$ 1,000,000
						GENERAL AGGREGATE	$ 2,000,000
		GEN'L AGGREGATE LIMIT APPLIES PER:				PRODUCTS - COMP/OP AGG	$ 2,000,000
		POLICY [X] PRO-JECT [ ] LOC					
		AUTOMOBILE LIABILITY				COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
		X ANY AUTO					
		ALL OWNED AUTOS				BODILY INJURY (Per person)	$
		SCHEDULED AUTOS					
		HIRED AUTOS				BODILY INJURY (Per accident)	$
		NON-OWNED AUTOS					
						PROPERTY DAMAGE (Per accident)	$
		GARAGE LIABILITY				AUTO ONLY - EA ACCIDENT	$
		ANY AUTO				OTHER THAN AUTO ONLY: EA ACC	$
						AGG	$
		EXCESS/UMBRELLA LIABILITY				EACH OCCURRENCE	$
		OCCUR [ ] CLAIMS MADE				AGGREGATE	$
							$
		DEDUCTIBLE					$
		RETENTION $					$
		WORKERS COMPENSATION AND EMPLOYERS' LIABILITY				X WC STATU-TORY LIMITS [ ] OTH-ER	
		ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Yes				E.L. EACH ACCIDENT	$ 100,000
		If yes, describe under SPECIAL PROVISIONS below				E.L. DISEASE - EA EMPLOYEE	$ 100,000
						E.L. DISEASE - POLICY LIMIT	$ 500,000
		OTHER					

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES / EXCLUSIONS ADDED BY ENDORSEMENT / SPECIAL PROVISIONS

(Indicate the Project and Project number in this space.)
The State of Connecticut is endorsed as an Additional Insured on all of the above policies except Auto-Mobile Liability and Workers' Compensation. If Builders Risk is indicated, The State of Connecticut is endorsed as Loss Payee

CERTIFICATE HOLDER

State of Connecticut
Department of Children and Families
505 Hudson Street
Hartford, CT 06106

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, BUT FAILURE TO DO SO SHALL IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

AUTHORIZED REPRESENTATIVE

IMPORTANT

If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

DISCLAIMER

The Certificate of Insurance on the reverse side of this form does not constitute a contract between the issuing insurer(s), authorized representative or producer, and the certificate holder, nor does it affirmatively or negatively amend, extend or alter the coverage afforded by the policies listed thereon.

Agreement Between Owner and Contractor

Owner

Department of Children and Families
High Meadows
825 Hartford Turnpike
Hamden, CT 06157

Contractor

Project

School Rehab
Project # 20-HMCF-096

The Owner and the Contractor for the considerations named herein as set forth below:

1. **Agreement Date:**

2. **Contract Sum:**

3. **Payment Schedule:**
   Owner will pay Contractor four equal payments, less 10% retention.
   Retention will be released 30 days after completion.

4. **Documentation required for payment:**
   Application for Payment (detailed invoice) of work completed to date. Waiver of lien for the amount of payment due. Supporting documents from suppliers and subcontractors. Inspection reports, signed approving work performed (where applicable). Signed change orders.

5. **Completion Schedule:** 150 Calendar days

   Start date: Completion Date:

   5b. Late Completion, the Owner will penalize the Contractor:
   $350 per calendar day

6. **Scope of Work:**
   Rehab approximately 7500 sq. ft. of office/classroom area in accordance with all Plans, Specifications and Addenda.

7. **Work NOT to be performed:**
   N/A

8. **Licenses, permits and bonds to be supplied and paid by the as follows:**
   Contractor to acquire and pay for permits and bonds related to the work to be performed.

9. **Warranty:**
   Contractorôs Labor and Material warranty, 18 months.
   Manufacturerôs warranty, where applicable.

10. **Insurance Requirements:**
    Certificate of Insurance, naming the owner as ADDITIONAL INSURED.
    Workerôs Compensation and General Liability in the amounts as stated in the project specifications.
    Vehicle Coverage as stated in the project specifications.

11. **General Provisions:** Contractor is to include all labor and approved materials, Appliances and services of every kind necessary for the execution of work. Contractor shall re-execute any work that fails to conform to the requirements of the contract. Contractor will remove all of his construction debris from the site and leave premises in ñbroom-cleanedò condition. All work shall be completed in a workmanship like manner and in accordance with all codes and other applicable laws. To the extent required by law, all work shall be performed by individuals duly licensed and authorized by law to perform said work. Contractor has the right to let other contracts in connection with the work contracted for so long as the comply with all the requirements of the documents. Contractor shall adequately protect the work, adjacent property and the public and shall be responsible for any damages or injury due to his act or neglect. Change Orders shall be in writing and signed by both parties to this agreement.

12. Contract Documents include this Agreement and others as follows:
    Plans dated
    Specifications dated
    Addendum

13. See attachment(s): ☐ yes ☐ no

Owner Contractor:

By: _____ By: _____
Date Date

_____ _____
Name and Title Name and Title

_____ _____
Witness Witness

_____ _____
Name and Title Name and Title

LABOR AND MATERIAL BOND

Know all men by these presents

THAT _____ of the

Town of _____ , Country of _____ and

State of _____ , as Principal (hereinafter called the Principal), and _____

(a surety company authorized to transact business in the State of Connecticut), as Surety (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, administrators and assigns (or itself, its successors and assigns), and the said Surety binds itself its successors and assigns jointly and severally firmly by these presents.

Signed, sealed and delivered this _____day of _____A. D. 20 ____

THE CONDITION OF THIS OBLIGATION IS SUCH THAT

WHEREAS said Principal will enter into a certain written contract with said Obligee, to be dated

the _____day of _____A. D. 20 ____ which written contract shall provide for the following:

which contract, including any hereafter made 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, 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.

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 therefore, may bring 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.

IN TESTIMONY WHEREOF*,* the said Principal has hereunto set his / its hand and seal, and the said Surety has caused this instrument to be signed by its attorney in fact and its corporate seal to be hereunto affixed, the day and year first written.

Witnesses as to Principal SEAL

_____

_____ **,Its Duly Authorized**

_____
(Print Name)

_____

_____
(Print Name)

SEAL

Witnesses as to Surety

_____ **by** _____ _____
Its attorney in fact

_____
(Print Name)

_____

_____
(Print Name)

PERFORMANCE BOND

Know all men by these presents

THAT _____ of the

Town of _____ , Country of _____ and

State of _____ , as Principal (hereinafter called the Principal), and _____

_____

(a surety company authorized to transact business in the State of Connecticut), as Surety (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, administrators and assigns (or itself, its successors and assigns), and the said Surety binds itself its successors and assigns jointly and severally firmly by these presents.

Signed, sealed and delivered this _____day of _____A. D. 20 ____

THE CONDITION OF THIS OBLIGATION IS SUCH THAT

WHEREAS said Principal will enter into a certain written contract with said Obligee, to be dated

the _____day of _____A. D. 20 ____ which written contract shall provide for the following:

which contract, including any hereafter made 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 terms, conditions and stipulations of said contract, as it may be extended, modified or altered, 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 such. extension, modification or alteration or any 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, their heirs, executors, administrators, successors or assigns from liability hereunder, notice to the Surety of any such extension, modification, alteration or forbearance being hereby specifically and absolutely waived.

IN TESTIMONY WHEREOF*,* the said Principal has hereunto set his / its hand and seal, and the said Surety has caused this instrument to be signed by its attorney in fact and its corporate seal to be hereunto affixed, the day and year first written.

Witnesses as to Principal SEAL

_____

_____ **,Its Duly Authorized**

_____
(Print Name)

_____

_____
(Print Name)

SEAL

Witnesses as to Surety

_____ **by** _____
Its attorney in fact

_____
(Print Name)

_____

_____

(Print Name)

General Conditions of the Contract for Construction
Department of Public Works
State of Connecticut

Table of Contents

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 ADDITIONAL OR DELETED WORK: Work required by the Department that, in the judgment of the Commissioner, involves any addition to, deduction from, or modi-fication of the Work required by the Contract Documents.

1.2 AGENCY: The (User) Agency of the State of Connecticut having administrative authority of the facility in which the Work is being performed.

1.3 APPLICATION FOR PAYMENT, PARTIAL PAYMENT OR REQUISITION: Contractorôs 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.

1.4 ARCHITECT OR ENGINEER: An individual, 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 construc-tion and when authorized to perform the duties of the Construction Administrator.

1.5 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.

1.6 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.

1.7 BIDDER: An individual, partnership, firm, corporation or other business organization submitting a Bid on the Bid Proposal Form for the Work contemplated.

1.8 BIDDING DOCUMENTS: Collectively, the Bidding Requirements and the proposed Contract Documents, including any addenda issued prior to receipt of Bids.

1.9 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.

1.10 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.

1.11 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.

1.12 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.

1.13 CERTIFICATE of COMPLETION: A document issued by the Construction Administrator to the Owner stating that the Contractor has met all contractual obligations.

1.14 CERTIFICATE of COMPLETION and ACCEPTANCE: A document issued by the Owner to the Contractor stating that all Work has been completed and that the Work is accepted by the Owner.

1.15 CERTIFICATE of COMPLIANCE: A document issued to the Owner by the design professional 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

1.16 CERTIFICATE OF OCCUPANCY: Document issued by the authority having jurisdiction certifying that all or a designated portion of a building is approved for its desig-nated use.

1.17 CERTIFICATE OF SUBSTANTIAL COMPLETION: A document prepared by the Architect and approved by the Owner on the basis of an inspection stating :

1.17.1 that the Work, or a designated portion thereof, is determined to be Substantially Complete;

1.17.2 the date of Substantial Completion;

1.17.3 the responsibilities of the Owner and the Contractor for security maintenance, heat, utilities, damage to the Work and insurance; and

1.17.4 the time within which the Contractor shall complete the remaining work .

1.18 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 Contract Time.

1.19 COMMISSIONER: The State of Connecticut, Department of Public Works (DPW) Commissioner acting di-

rectly or through specifically authorized DPW personnel or agent(s) having authority to perform duties defined in Article 25.

1.20 CONSTRUCTION ADMINISTRATOR: An individual, 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 Public Works Assistant Project Manager, Department of Public Works 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.

1.21 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.

1.22 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.

1.23 CONTRACTOR OR GENERAL CONTRACTOR: An individual, partnership, firm or Corporation, under direct contract with the Department of Public Works, responsible for performing the Work under the Contract Documents. Whenever the words ñContractorò or ñGeneral Contractorò are used it shall be understood to mean Contractor.

1.24 CONTRACTOR'S LIABILITY INSURANCE: Insurance purchased and maintained by the Contractor that insures the Contractor for claims for property damage, bodily injury or death.

1.25 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.

1.26 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.

1.27 CONTRACT TIME: The period of time allotted in the Contract Documents for Substantial Completion of the Work, including authorized adjustments thereto. The days specified, calendar or working days, are stipulated in the Bidding Documents.

1.28 DAY: Whenever the word Day is used it shall be understood to mean calendar day or working day as stated on the Bidding Documents, unless stated otherwise.

1.29 DEPARTMENT OF PUBLIC WORKS PROJECT MANAGER or 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.

1.30 EQUAL (S):: A replacement for the specified material, device, procedure, equipment, etc., which has been determined by the Architect and the Owner to be substantially identical to the first listed manufacturer or first listed procedure specified in terms of cost, quality and performance for the Project. The Equal does not constitute a modification in the scope of Work, the Schedule or Architect/Engineerôs design intent of the specified material, device, procedure, equipment, etc.

1.31 FINAL ACCEPTANCE: The Ownerôs written approval and acceptance of the Work issued to the Contractor upon written certification by the Architect of Final Completion.

1.32 FINAL COMPLETION: A written statement by the Architect to the Owner that the Work has been completed in accordance with the terms and conditions of the Contract Documents.

1.33 FINAL INSPECTION: Review of the Work by the Arc4itect and Owner to determine whether Final Completion has been achieved.

1.34 FINAL PAYMENT: The last payment made by the Owner to the Contractor, made after notice of the Final Acceptance. Payment shall include the entire unpaid balance of the Contract Sum as adjusted by Modifications.

1.35 GENERAL CONDITIONS: The General Conditions of the Contract for Construction, part of Division 0 of the Specifications.

1.36 GENERAL REQUIREMENTS: That part of the Contract Documents entitled General Requirements, which is Division 1.

1.37 LIQUIDATED DAMAGES: A sum established in a Contract, usually as a fixed sum per day, as the predeter-

mined measure of damages to be paid to the Owner due to the Contractorôs failure to complete the Work within the Contract Time.

1.38 LUMP SUM: An item or category priced as a whole rather than broken down into its elements.

1.39 MINOR CHANGES IN THE WORK: Changes in the Work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents, which shall be affected by written order issued by the Architect.

1.40 MODIFICATION OR AMENDMENT:

1.40.1 A written change to the Contract Documents.
1.40.2 A Change Order.
1.40.3 A Construction Change Directive.
1.40.4 Supplemental Instructions for minor changes in the Work and/or additional instructions to the Work.

1.41 NOTICE TO BIDDER: A notice contained in the Bidding Document informing prospective Bidders of the opportunity to submit Bids on a Project.

1.42 NOTICE TO PROCEED: Written notice, issued by the Commissioner or the Commissionerôs authorized representative, to the Contractor authorizing the Contractor to proceed with the Work and establishing the date for commencement of the Contract Time.

1.43 OWNER OR DEPARTMENT: The State of Connecticut, Department of Public Works acting through its Commissioner or specifically authorized Department personnel or agent.

1.44 PAYMENT BOND, LABOR BOND OR MATERIAL BOND: A bond in which the Contractor and the Contractorôs 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.

1.45 PERFORMANCE BOND OR SURETY BOND: A bond in which the Contractor and the Contractorôs surety guarantee to the Owner that the Work will be performed in accordance with the Contract Documents, as required by Connecticut General Statutes Section 41.

1.46 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.

1.47 PLANS OR DRAWINGS: All drawings or reproductions of drawings pertaining to the construction of the Work contemplated and its appurtenances.

1.48 PROJECT: The total construction of which the Work performed under the Contract Documents may be the whole or a part.

1.49 PROJECT MANUAL: The set of documents assembled for the Work which includes, but is not limited to, Contract Documents, Bidding Requirements, Sample Forms, Conditions of the Contract, General Requirements and the Specifications.

1.50 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 manufacturerôs procedure, exact model number, item, etc., of those products acceptable to the Owner.

1.51 RECORD DOCUMENTS OR AS-BUILT DRAWINGS: Construction Drawings revised to show all significant Modifications made during the construction process.

1.52 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 and their relationship to Substantial Completion and Final Completion of the Work, rendered in a form permitting determination of the optimum sequence and duration of each operation.

1.53 SCHEDULE OF VALUES: A document furnished by the Contractor to the Architect 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 Contractorôs Applications for Payment.

1.54 SECONDARY SUBCONTRACTOR: An individual, partnership, firm or Corporation under direct contract with the Subcontractor to the General Contractor.

1.55 SHOP DRAWINGS: Drawings provided to Architect 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.

1.56 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.

1.57 SUBCONTRACTOR: A person, 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.

1.58 SUBMITTALS: Documents including, but not limited to, samples, manufacturerôs data, shop drawing, or other such items submitted to the Owner and Architect by the Contractor for the purpose of approval or other action, as required by the Contract Documents.

1.59 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 so the Owner can occupy or utilize the Work for its intended use.

1.60 SUBSTITUTION: A material, device, procedure, equipment, etc., which has been determined by the Architect and the Owner to be not an Equal to the first manufacturer or procedure listed in the Specification in terms of cost, quality and performance but which may be used in place of that item specified. . The Substitution constitutes a modification in the Work, the Schedule or the Architect/Engineerôs design intent of the specified material, device, procedure, equipment, etc.

1.61 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.

1.62 SUPPLEMENTARY CONDITIONS: An extension of the General Conditions applicable to any and all portions of Work under the Contract Documents.

1.63 THRESHOLD LIMIT BUILDING: Any proposed (new) structures or additions as defined by the Connecticut General Statutes Section 29-276b.

1.64 UNIT PRICE: The monetary value stated by the Owner or the Contractor, as a price per unit of measure for materials or services as described in the Contract Documents and/or Bidding Documents.

1.65 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 Contractorôs 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 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 of 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 General Requirements take precedence over the Supplementary Conditions.
3.1.3 The Supplementary Conditions take precedence over the General Conditions.
3.1.4 The General Requirements take precedence over the General Conditions.
3.1.5 The Specifications shall take precedence over the Plans.
3.1.6 Stated dimensions shall take precedence over scaled dimensions.
3.1.7 Large-scale detail drawings shall take precedence over small-scale drawings.
3.1.8 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 Contractorôs 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 Completion, 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 Bidding 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.

4.3 The Contractorôs early completion schedule notwithstanding, the Owner reserves the right to order Modifications to the Work in accordance with Article 13 at any time during the Contract Time.

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 Contractorôs elected early completion and the end of the Contract Time. Costs include, but are not limited to, delays extended home or field office costs, 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 Ownerôs control, then the Contract Time may be extended by Change Order for such reasonable time as demonstrated by the Contractorôs 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 Contractorôs 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.

Article 5
SUBMITTALS, PRODUCT DATA, SHOP DRAWINGS AND SAMPLES

5.1 Contractor shall review, approve and submit to the Construction Administrator all submittals including but not limited to Product Data, Shop Drawing and Sample Manufacturers, with such promptness as to cause no delay in the Work.

5.2 Correction or approval of such submittals, Shop Drawings, Product Data sample will be made with reasonable promptness by the Architect. 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 Ownerôs written approval.

5.3 No Work governed by such drawings, schedules or samples shall be fabricated, delivered or installed until approved by the Architect.

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 Ownerôs 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 Contractorôs failure to coordinate the work with any Contractor or Subcontractor.

Article 7
COOPERATION OF TRADES

7.1 The 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 for each day beyond the date given for Substantial Completion of the Contract according to the Contract Time.

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 Ownerôs 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 enjions 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

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 mechanic, laborer or workman employed upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund, as defined in subsection (h) of section 31-53 of the general statutes, 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 employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each pay day."

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) calendar 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 two weeks for the Owner and its agentsô 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 and its agents.

11.1.3 When the Contract Documents specify a ñCPM Scheduleò a detailed Critical Path Method Schedule is required using software approved by the Owner 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 ñConstruction Scheduleò 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 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.

12.2 Should this Contract be for a public works project other than for the construction, remodeling or repairing of public buildings covered by Connecticut General Statutes Section 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 not 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 sub-division 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 26. 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 such Change Orders make 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 and the Owner agree that the Contract Time specified for the performance of the Contract shall include not only the Work of the original Contract but also any Additional Work ordered by the Owner by Change Order. No extension of time will be granted if it is the opinion of the Owner that the additional Work can be performed concurrently with the original Work.

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 such additional work cannot be performed concurrently with the original Work.

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

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 Lump Sum must be based upon the following itemized costs:

13.6.1.3.1 Labor (Contractorôs or Subcontractorôs own forces)

13.6.1.3.2 Material (Used by Contractorôs or Subcontractorôs own forces).

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.

13.6.1.3.4 Rented Equipment (Used directly on the Work and by the Contractorôs or Subcontractorôs own forces).

13.6.1.3.5 Owned Equipment (Used directly on the Work and by the Contractorôs or Subcontractorôs 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.

13.6.1.3.6 Trade related equipment, hand tools and power tools, normally supplied with the labor are not compensable.

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

13.6.2.1 Contractorôs markup for Work performed by their 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 Contractorôs markup for Work performed by their Subcontractors forces.:

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)

13.6.4.1 Subcontractorôs markup for Work performed by their 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 Subcontractorôs markup for Work performed by their Secondary Subcontractorôs forces.

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

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

13.8 On Work performed by a Secondary Subcontractor, the Owner recognizes no markup by the Secondary Subcontractor.

13.9 If Unit Prices are not applicable and the parties cannot agree upon a lump sum, then the Commissioner, through the Construction Administrator, 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 based upon the following:

13.9.1.1 Labor (Contractorôs or Subcontractorôs own forces)

13.9.1.2 Material (Used by Contractorôs or Sub- contractorôs 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 Contractorôs or Subcontractorôs own forces).

13.9.1.5 Owned Equipment (Used directly on the Work and by the Contractorôs or Subcontractorôs 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 Contractorôs records at any time upon written request from the Commissioner.

13.11 If the Contractor wishes to make a claim for an increase in the Contract Sum for any damages sustained as a result of Additional Work, then the Contractor shall give the Owner, through the Construction Administrator, written notice thereof within seven (7) calendar days after the occurrence of the event giving rise to such claims.

13.12 No such claims shall be valid if the written notice is submitted after the required seven (7) calendar days. In addition, the Contractor shall file with the Owner through the Construction Administrator daily or weekly itemized statements of the details and cost of such Work performed or damage sustained as may be required by the Owner.

13.13 Failure of the Contractor to negotiate in good faith issues of time and costs and failure to provide requested documentation within (14) fourteen calendar 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 Construction Administrator, shall issue a written 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 than 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 Each request for an Equal or Substitution shall be submitted, with the appropriate documentation, as detailed in the Contract Documents, to the Construction Administrator. All requests will be compared to the first manufacturer or first procedure listed in the specific Specification 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 and cost. All submissions must include all the required data for the first listed manufacturer or procedure as specified, as well as the proposed Equal or Substitution. The submission of all Equals or Substitutions to those specified must be made within the days listed below after the contract start date. After that time period, the Contractor shall provide what is specified unless otherwise allowed within the sole discretion of the Commissioner.

15.3.1 30 days for projects having a Contract Time duration of 180 days or less

15.3.2 60 days for projects having a Contract Time duration of 181 days to 360 days

15.3.3 90 days for projects having a Contract Time duration of 361 days or greater

15.4 Contractor shall submit each request for Equal or Substitution to the Architect 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.

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 are 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 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.

16.2 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 construction is carried on. The Contract Documents 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 Contractorôs 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 check-out of the Work. The Contractor shall furnish promptly all reasonable facilities, labor and materials necessary to make all such testing safe and convenient.

16.4 If, at any time before Final Completion and Final 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 Contractorôs 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 re-inspecting, services of required consultants, additional supervision, the Commissionerôs and the Construction Administratorôs administrative costs, and other costs for services of other consultants.

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 Completion 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 involve part of the Work, the Contractor shall obtain the services of a qualified underground utility locating firm, at no cost to the Owner, to verify locations of underground utilities, to provide safety, protect the Work and protect the workmen as necessary to perform the Work.

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 Contractorsô ñManual of Accident Prevention in Constructionò, 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 excavation, 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 do 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 bid 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 60 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 Ownerôs 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.

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 Final Completion of the Work, the Contractor shall remove from and about the site of the Work, all rubbish and 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 Department of Public Works Project Manager is the Commissionerôs only authorized representative to act in matters involving the Ownerôs or Architectôs 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 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.

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 noncompliant 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 Contractorôs 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.

27.4 The Schedule of Values shall include a breakdown of Contract closeout costs including systems certification testing and acceptance, training, warranties, guarantees, as-builts 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 The Commissioner will examine the Contractorôs applications for payments to determine, in the opinion of the Commissioner, the amounts that properly represent the value of the Work completed and for the materials suitably stored on the site.

28.2 In making such Application For Payment for the Work, there shall be deducted (10%) ten percent of the amount of each payment to be retained by the Owner until Final Completion.

28.3 At the sole discretion of the Commissioner, and after

completion and acceptance of (60%) sixty percent of the value of the Work, and if the character and progress of the Work remain satisfactory, the retained portion of the Application for Payments may be reduced to five percent (5%) of total payments. The minimum total amount of payment retained, prior to the Final Payment shall not be less than five percent (5%) of the Contract Sum.

28.4 The decision of the Commissioner to reduce the retainage rate will be based upon the Contractorôs performance for completed portions of the Work as set out below and other factors the Commissioner may find appropriate:

28.4.1 The Contractorôs 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 Ownerôs and/or Architectôs comments on the submitted material resulting in an appropriate basis for progress of the Work.

28.4.2 The Contractorôs timely and proper submission of all Contract required submissions: including but not limited to shop drawings, material certificates and material samples and the prompt resolution of the Owners and/or Architectôs comments on the submitted material resulting in an appropriate progress of the Work.

28.4.3 The Contractorôs provision of proper and adequate supervision and home office support of the Project and any Subcontractor Work resulting in coordinated progress and proper quality control for the Work.

28.4.4 The Work completed to date has been installed or finished in an acceptable manner which is satisfactory to the Owner.

28.4.5 The progress of the Work is consistent with the approved CPM Schedule or Construction Schedule.

28.5 No payments will be made for improperly stored or protected materials or unacceptable Work.

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 him 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
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 to the Construction Administrator.

30.1.2 Upon receipt of the request, the Architect, Construction Administrator and Owner, will make an inspection to determine if the Work or designated portion thereof is Substantially Complete. 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.

30.1.4 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.

30.1.5 The Certificate of Substantial Completion shall be signed by the Construction Administrator, Owner, and Architect.

30.1.6 Upon Substantial Completion of the Work or designated portion thereof and upon application by the Contractor and certification by the Construction Administrator and Architect, 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 Final Completion:

30.2.1 Upon Final Completion of the Work, the Contractor shall forward to the Construction Administrator a written notice that the Work is ready for Final Inspection and Acceptance and shall also forward to the Construction Administrator, a Final Application for Payment. Upon de-

termination by the Owner that all the Work is complete, the Owner will issue a Certificate of Completion and Acceptance.

30.2.2 When the Work has been completed in accordance with terms and conditions of the Contract Documents a Certificate of Completion shall be issued to be signed by the Contractor.

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 Completion and 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 Contractorôs sureties from any obligations under this Contract.

31.4 The Architect 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 Completion and Acceptance and a Certificate of Compliance have been issued.

31.6 Neither Final Payment nor any remaining retained percentage 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 Ownerôs 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 attorneyôs fees.

31.6.6 If, after Substantial Completion of the Work, Final Completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting Final Completion and the Construction Administrator and Architect so confirm, the Owner shall, upon application by the Contractor and certification by the Construction Administrator and Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Owner prior to Final Payment. Such payment shall be made under terms and conditions governing Final Payment, except that it shall not constitute a waiver of Claims.

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.

32.1.3 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 section 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 documents, 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 Neither Final Payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect through the Construction Administrator:

32.4.1 An affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Ownerôs property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied,

32.4.2 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 until at least 30 daysô prior written notice has been given to the Owner,

32.4.3 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,

32.4.4 Consent of surety, if any, to Final Payment and

32.4.5 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.

32.5 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 attorneyôs 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 to be 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 calendar 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 Contractorôs 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 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.

33.2.3 Termination of the Contract shall not relieve the Contractor or its Surety of their responsibilities for the completed Work, nor shall it relieve the Contractorôs 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 00300 CERTIFICATE OF INSURANCE and 00020 BID PROPOSAL FORM, subsections 4.4.2 and 4.4.3, of this 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 Contractorôs insurance provides coverage on behalf of the Subcontractor. The Contractor shall send Certificates of Liability Insurance to the Bidding and Contracts Unit, Department of Public Works, 165 Capitol Avenue, Room G-9A, 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) must also be included when applicable to the Work to be performed. The State of Connecticut 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 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.

35.1.4 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 Federal Act endorsement for U.S. Longshoremenôs and Harbor Workers Act.

35.1.5 Special Hazards insurance, if required, will be stated in SECTION 00020 BID PROPOSAL FORM, subsection 4.4.2 of this Project Manual. This includes coverage for explosion, collapse or underground damage and shall be no less than $1,000,000 each occurrence.

35.1.6 Builder's Risk insurance, if required, will be stated in SECTION 00020 BID PROPOSAL FORM, subsection 4.4.3 of this Project Manual.

35.1.7 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 Builderôs Risk policy.

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 Employerôs 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 ñFollow-Formò basis.

35.3 Each insurance policy required to be maintained by the Contractor except Workersô Compensation and Automobile Liability shall endorse the State of Connecticut as an Additional Insured. Additional Insured endorsements shall provide coverage on a primary basis.

35.4 When required to be maintained, the Builderôs Risk and Inland Marine/Transit Insurance policy shall endorse the State of Connecticut as a Loss Payee.

35.5 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.

35.6 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.

35.7 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.

35.8 Hold Harmless Provisions: The Contractor shall at all times indemnify and save harmless the State of Connecticut, the Department of Public Works, 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 Public Works.

Article 36
FOREIGN MATERIALS

36.1 Preference shall be given to articles or materials manufactured or produced in the United States, conditions of quality and price with duty being equal.

36.2 Only domestic articles or materials will be used unless a statement is submitted with the proposal that enumerates the foreign articles of materials proposed to be used and such proposal is accepted by the Owner. 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
DAYS OF WORK

38.1 Working Calendar Days include all days that the Contractor is permitted to execute the Work or employ any person to execute the Work within the Contract Time.

38.2 Non-working Calendar Days include all Saturdays, Sundays, Legal State Holidays and any other days identified in the Contract Documents that the Contractor is not permitted to execute the Work or employ any person to execute the Work. The restriction of non-working Calendar Days may be suspended upon the approval or direction of the Commissioner.

Article 39
CONTRACT TIME

39.1 The Contract Time is the number of calendar days, allotted in the Bidding Documents, for execution and Substantial Completion of the Work, including authorized adjustments thereto. The Contract Time is the sum of all working and non-working calendar days.

39.2 If weather conditions prevent the Contractor from executing the Work., the Contract Time may be extended by Change Order, for such reasonable time as may be determined by the Owner.

Article 40
CALENDAR DAY

40.1 This is each day of the calendar.

End of Section

SUPPLEMENTAL CONDITIONS

ARTICLE - 1. - SCOPE OF WORK:

(a) The Contractor shall furnish all labor, materials, equipment, plant, power, water, light, heat, fuel, tools, appliances, supplies and all other means of construction necessary or proper for executing and completing the project; he shall do all work including extra and additional work and pay all costs connected therewith; restore to their original conditions all surfaces disturbed; pay cost of all insurance; bear all losses due to the nature of the work and costs incidental to suspension or discontinuance of the work except as otherwise provided; assume all responsibility of whatever nature of kind, indemnify the Owner from all claims; secure and pay for all permits unless otherwise provided; conform to all county, state, municipal or federal legislation and requirements; he shall do all work necessary to conform the project to the Contract Documents and shall leave intact the work of any adjoining contractors unless otherwise ordered by the Owner; perform and complete the work in a manner best calculated to permit rapid construction, consistent with safety of a life and property and satisfactory to the Owner and in strict accordance with the Contract Documents; he shall protect the work during construction, clean up the work during and after construction and maintain it until final acceptance, as hereinafter provided.

(b) The Contractor shall do all work and pay all costs of protecting, supporting, maintaining, repairing if damaged, relocating and restoring all surface, subsurface or overhead structures and all other property including pipes, conduits, ducts, tubes, chambers and appurtenances, public or private, in the vicinity of the work, except as otherwise specified.

ARTICLE - 2. SUPERINTENDENCE AND WORKERS:

(a) The employment of competent superintendent, foremen and experienced mechanics and laborers and others skilled in the particular duties entrusted to them will be required. Whenever the Owner shall inform the Contractor or his representative in charge that any man on the job is incompetent or disorderly or is working contrary to the specifications or the instructions of the Owner, or that the Owner knows that he/she has been incompetent or disorderly on this or any previous work, that person shall thereupon be immediately dismissed from the job and shall not be given employment on any work connected with the contract.

(b) If requested, the Contractor shall deliver to the Owner each week a record of the numbers and classifications of workers employed upon the project each day of the previous week.

ARTICLE 3. INSPECTION:

Authorized representatives and agents of the Owner, shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

ARTICLE 4. REPORTS, RECORDS AND DATA:

The Contractor and each of his subcontractors shall submit to the Owner such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed under this Contract.

ARTICLE 5. WEATHER CONDITIONS:

In the event of temporary suspension of work, or during inclement weather, or whenever the Owner shall direct, the Contractor shall, and shall cause his subcontractors to protect carefully his and their work and materials against damage or injury from the weather. If, in the opinion of the Owner, any work or material was damaged or injured by reason of failure on the part of the Contractor or any of his subcontractors so to protect his work, or otherwise damaged by the negligence of the Contractor, subcontractors or their agents or servants, or is otherwise defective, such materials shall be removed and replaced at the expense of the Contractor.

ARTICLE 6. ENUMERATION OF DRAWINGS, SPECIFICATIONS AND ADDENDA:

Following are the drawings, specifications and addenda which form a part of this contract, as set forth in Article I of the Contract and General Conditions, "CONTRACT AND CONTRACT DOCUMENTS":

(a) Drawings: A00.1, D10.1, A10.1, A1.02, M.1.01, E.002, A.1.02

(b) Specifications:

General Conditions - Pages GC-1 through GC-21, Supplemental Conditions - Pages SC-1 through SC-6, Technical Specifications ï Divisions 2 through 16,

(c) Addenda:

No.	Date	No.	Date
No.	Date	No.	Date

ARTICLE 7. PROTECTION OF LIVES AND HEALTH:

(a) In order to protect the lives and health of his employees under the contract, the Contractor shall comply with all safety provisions of applicable laws, building and construction codes and all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Incorporated, and shall maintain an accurate record of all cases of death, occupational disease, and injury requiring medical attention or causing loss of time from work, arising out of and in the course of employment on work under this contract.

(b) The Contractor alone shall be responsible for the safety, efficiency and adequacy of his plant, appliances and methods, and for any damage, which may result from their failure or their improper construction, maintenance or operation.

(c) The Contractor shall be solely responsible for the acts and omissions of his agents, employees and his subcontractor and their agents and employees and shall hold the Owner harmless and defend the Owner against damages or claims for damages arising out of injuries to other or property of others which result from said acts or omissions.

ARTICLE 8. WORK TO BE ACCOMPLISHED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATION

The work, during its progress and at its completion, shall conform to the lines and grades shown on the drawings and to the directions given by the Owner from time to time, subject to such modifications or additions as he shall determine to be necessary during the execution of the work; and in no case will any work be paid for which is performed in excess of such requirements.

ARTICLE 9. CONTRACTOR TO CHECK DIMENSIONS AND SCHEDULES:

The Contractor will be required to check all dimensions and quantities shown on the drawings or schedules given to him by the Owner, and shall notify the Owner of all errors therein which he may discover by examining and checking the same.

The Contractor shall not take advantage of any error or omission in these specifications, drawings and schedules. The Owner will furnish all instructions should such error or omission be discovered, and the Contractor shall carry out such instructions as if originally specified.

ARTICLE 10. SEQUENCE OF WORK:

The Contractor shall be required to prosecute his work in accordance with a schedule prepared by him in advance in accordance with additional requirements specified herein and approved by the Owner. This schedule shall state the methods and shall forecast the times for doing each portion of the work. Before beginning any portion of the work, the Contractor shall give the Owner advance notice and ample time for making the necessary preparations.

ARTICLE 12. STREETS AND SIDEWALKS TO BE KEPT OPEN:

(a) The Contractor shall at all times keep the streets and sidewalks open for pedestrian and vehicular traffic. If, in the opinion of the Owner, the interest of abutters and public requires it, the Contractor shall bridge or construct plank crossings over the trenches at street crossings, roads or private ways. The Contractor shall conduct his work for this objective in such manner as the Owner may direct from time to time. No sidewalk shall be obstructed where it is possible to avoid it. No additional payment shall be made to the Contractor for such work.

(b) The Contractor shall provide all necessary Fire Crossings at principal intersection or ways usually traveled by fire apparatus with provisions for the apparatus to have access to all areas which require fire protection.

(c) All work shall be conducted in such a manner as to provide minimum interference with facility and its daily operation.

ARTICLE 13. LIGHTS, BARRIERS, FENCES, WATCHMEN AND INDEMNITY:

(a) The Contractor shall put up and maintain such barriers, fences, lighting and warning lights, danger-warning signals and signs necessary to prevent accidents during the construction work and protect the work and insure the safety of personnel and the public at all times and places; and the Contractor shall defend, indemnify and save harmless the Owner and their agents in every respect from any injury or damage whatsoever caused by any act, omission or neglect of the Contractor or his Subcontractor, or their servants or agents, including any claims arising out of failure to erect and maintain sufficient railing or fence as required by Section 13al1l, Connecticut General Statutes.

The fact that the Owner may retain control of the premises, or that it or its agents may take action to erect or maintain railings or fences shall not relieve the Contractor's obligations hereunder.

(b) The Contractor at his own expense shall furnish, maintain and use, and cause all his Subcontractors to furnish, maintain and use all necessary safety devices and safe practices in prosecution of the work and to adopt, follow and maintain such additional safety measures as in the opinion of the Owner are conducive to safe operation by the Contractor and the Subcontractors. The Owner shall have the right to order any or all work suspended where, in the Owner's opinion, such work is not being carried on in a safe and proper manner, or where persons and property are not being properly protected or safeguarded and such work shall not be resumed until the Owner's requirements have been met and the Owner has directed that work be resumed. The work required by the preceding paragraph shall be totally at the Contractor's expense.

(c) In addition to the above, when and as necessary, or when required by the Owner, the Contractor shall post signs and employ watchmen or flagmen for the direction of traffic at the site and for excluding at all times unauthorized persons from the project. The Contractor will not be paid additional compensation for this work.

(d) The Contractor shall be responsible for excluding at all times from lands within project limits, all persons not directly connected with the work or authorized by the Owner to be within the project areas.

ARTICLE 14. FACILITIES:

The Contractor is responsible for providing and maintaining all necessary facilities whether temporary or permanent for all those employed by the Contractor. The locations of such temporary facilities must be approved by the Owner. Under no circumstances will the Contractor nor any of his Subcontractors or Venders be allowed to use any of the Owners facilities.

ARTICLE 15. UTILITIES:

The provision and costs for all electrical, water, telephone, etc. utilized by the Contractor and his Subcontractors and venders shall be by the Contractor. Under no circumstances shall the Contractor use any of the Facilities utilities or resources without approval of the Owner.

Special Conditions

Outside Contractors Working with in the Facility

POLICY:

Any employee who plans to work on grounds must be cleared first by the Department of Children and Families. Driver Liesence and Socila Security numbers are required for this back ground check. Please provide this information suffciently in advance of construction. Any change in personel during the project will require the same clearance. Any individual not clear to be on site will be escorted from the site.
All outside contractors will coordinate all work within High Meadows Childrenôs Facility with the Plant Facility Engineer and/or Building Maintenance Supervisor before beginning work.

PROTOCOL:

* Before beginning work, all outside contractors shall check in at the Building Maintenance Supervisor's office. The outside contractor will supply the following information: scope of work, authorization, duration and any pertinent information that is required. He will also sign in and be issued a pass badge that must be worn if working in patient areas.

* **All** contractors shall work as professionally as possible so as not to aggravate patients, staff and visitors.

· **All** contractors shall follow the Facility smoking policy.

· If special parking is required, permission shall be granted and coordinated through the Building Plant Facility Engineer's office.

· **All** contractors are to maintain their work area as clean as possible while working and clean up thoroughly when finished.

* If any utilities or critical systems are to be interrupted, notification of the Plant Facility Engineer is mandatory. Engineering Department personnel will in turn assist.

· **All** contractors are expected to use courtesy. Loud and abusive language will not be tolerated.

o Contractors must provide assurance not to block corridors and fire exits.

· Any life safety code violations incurred during construction or renovation will result in close coordination with plant operations interim life safety measures. The measures are required by JCAHO.

* All contractors working above the ceiling are required to replace all disturbed ceiling tile.

* All penetrations in smoke partitions are to be sealed with fire stop before final payment is made.

Upon completion of daily activities contractors are asked to check out and report progress to the Plant Facility Engineer's office.

When working in the building and on the grounds, it is important to remember that High Meadows is a Childrenôs Facility.

· Contact between patients and workers is to be avoided whenever possible. It is difficult to predict the reactions of our patients to novel situations or unknown persons. A worker and patient should never be alone without staff.

· All workers must assure that tools and supplies are maintained in a secure manner. Tools should not be left unattended.

· If you need assistance from High Meadows staff, please report to the reception areas in the Administration Building.

Please do not report to patient areas.

· MSDS sheets must be provided for any materials used on grounds before materials are brought on grounds.

* Contractors must show proof of proper licenses before the start of work.

SUBJECT: Outside Contractors - Hazard Communications Program

POLICY:

It is the responsibility **of** the **Plant Facility Engineer's** to provide on-site contractors with the following information:

· Hazardous chemicals to which they may be exposed while on the job site.

Precautions the contractor and his/her employees may take to lessen the possibility of exposure to lead or asbestos by usage of appropriate protective measures.

- It is the responsibility of the **Plant Facility Engineer** to contact each contractor before work is started to gather and disseminate information concerning hazards that the contractor will bring into the workplace. MSDS sheets will be given to the **Plant Facility Engineer's office before materials are received on site.**

Compliance with the OSHA Hazard Communications Standard is certified by:

Plant Facility *Engineer's Signature* **Date**

Contractors Signature **Date**

State of Connecticut

Department of Children and Families
High Meadows
825 Hartford Tnpk, Hamden, Connecticut 06157

CERTIFICATE OF COMPLETION

Project No.: 20-HMCF-096

Type of Project (emergency, bid, T&M): Bid ï School Rehab

Final Contract Value:

Specific Location:

As the duly authorized representative of the State of Connecticut, owner of the project above referenced, I hereby certify that work has been entirely completed for this project on contracts as follows:

Contractor **Description/Location of Work**

in accordance with all approved plans, specifications and contract documents, and these contracts are accepted as of _____.

Date: _____ **Plant Facility Engineer**

By: _____
F. Provenzano

Department of Public Works
State of Connecticut

Certificate of Compliance for Agency Administered Projects
(Non-threshold Projects Only)

Date Submitted to DPW:

To: Edward Curley
DPW/Special Projects Coordinator

Address: Department of Public Works
165 Capitol Avenue
Hartford, CT 06106

Attn Client Team:

Project No:

Project Name:
(Location)

Contract For:
(Type of Construction)

From Agency:

Address:

PART "1" - Design Phase (Prior to Bid Phase):
THIS IS TO CERTIFY THAT to the best of my knowledge, information, and belief, the above-described project has been designed in substantial compliance with requirements of the State of Connecticut Basic Building Code and all other applicable codes as required by Chapter 541, General Statutes of Connecticut.

Commissioner: _____ (Typed Name) _____ (Signature) _____ (Date)

Architect/Engineer: _____ (Typed Name) _____ (Signature) _____ (Date)

Registration Number: _____

PART "2" - Construction Completion (Prior to Agency Occupancy and/or Certificate of Occupancy Application):
THIS IS TO CERTIFY THAT to the best of my knowledge, information, and belief the completed project -described above is in substantial compliance with the approved plans and specifications and the requirements of the State of Connecticut Basic Building Code and all other applicable codes as required by Chapter 541, General Statutes of Connecticut.

Architect/Engineer: _____ (Typed Name) _____ (Signature) _____ (Date)

Registration Number: _____

General Contractor: _____ (Typed Name) _____ (Signature) _____ (Date)

License Number: _____

Commissioner: _____ (Typed Name) _____ (Signature) _____ (Date)

Copies : ☐ DPW (Original) ☐ DPS/OSBI ☐ General Contractor ☐ Architect/Engineer ☐ File

01000 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Number 20-HMCF-096 is entitled School Rehab. It is to be located in Hamden, Connecticut. It is to be completed and ready for use by the Owner and Agency within the Contract Time specified in Section 00020 Bid Proposal Form.

B. The Project Description:

1. The demolition of ceilings and misc. materials. Removal of heating system pipes.
2. Installing new interior wall assemblies. Renovating the interior spaces of the existing area including but not limited to new walls and ceilings.
3. The design and installation of a new mechanical HVAC system. (Contractor is responsible for the design and installation)

A. Project Location: 825 Hartford Tpk., Hamden, Connecticut.

01001 OWNER AND AGENCY

A. Owner/Agency: The Owner/Agency is the Department of Children and Families, State of Connecticut.

1. The authorized representative for the Owner/Agency is Richard Grossman, Project Manager. The Project Manager is located at 505 Hudson Street, Hartford, CT 06106. Phone: 860-550-6669; Fax: 860-560-5019; E-mail: Richard.grossman@po.state.ct.us.

a. The Project Manager is the authorized representative for the Department of Children and Families to act in matters involving, altering enlarging or relaxing any requirement of the Contract Documents.

01002 OWNER AND ENGINEER:

1. n/a

01003 CONSTRUCTION ADMINISTRATOR:

A. The Construction Administrator is Frank Provenzano, and is located at the High Meadows Childrenôs Facility, 825 Hartford Tpk., Hamden, CT 06157. Phone: 203-281-8378: Fax: 203-281-8372; E-mail: frank.provenzano@po.state.ct.us.

1. The Construction Administrator is referred to in the Contract Documents as ñConstruction Administratorò or ñConstruction Managerò 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 Administratorôs status is as defined as follows:
   a. The Construction Administrator is the Ownerôs Agent who will, among other things, monitor the General Contractorôs performance, scheduling and construction, process shop drawings, material, and equipment submittals, review and process periodic billings, review and recommend cost changes.
   b. 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 to the Contractor. All such requests and replies shall be in writing.

01010 SUMMARY OF WORK

A. Summary of Work includes but is not limited to the following:

1 ***Demolition***

2 ***Renovation***

3 ***New construction***

B. 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.

C. 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.

D. The Work will be constructed under a single lump.

E. Work Sequence:

1. The entire Project shall be constructed in **one** Phase. Work shall be complete, ready for occupancy on June 22, 2007.

01011 EXAMINATION OF SITE

A. It is not the intent of the Documents to show all existing conditions. All contractors are advised to visit and examine the site with the Construction Administrator prior to submitting bids.

B. Contractors should investigate and satisfy themselves as to the conditions affecting the work, including but no 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.

C. Pre-Bid Conference:

1. A Pre-Bid Conference and tour of the site will be conducted as scheduled in the Notice to Bidders. This scheduled conference is the only official opportunity for the bidders to tour the site with the Owner, Owner, Engineer, Construction Administrator, and Agency.

01012 PROJECT DOCUMENTS

A. The Specifications and Drawings are intended to describe and illustrate the materials and labor necessary for the work of this Project.

B. Throughout the Technical Specifications, the Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction Form 816, current addition 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.

01013 DOCUMENTS FURNISHED

A. The General Contractor will be given 3 sets of the Contract Documents on or about the time of execution of Contract, free of charge. If additional copies are wanted, they will be available at the direct additional cost of their reproduction, to the contractor.

B. The Contractor shall receive ***one (1)*** set of AutoCAD compatible (latest version) Floor Plans on disks at no cost on or about the time of execution of the Contract from the Owner. Additional sets of AutoCAD compatible (latest version) Floor Plans on disks from the Owner at the cost of their reproduction, to the contractor.

01014 CONTRACTOR'S USE OF PREMISES

A. The Contractor shall confine his operations, including storage of apparatus, equipment and materials to the contract limit lines as directed by the Construction Administrator.

B. The areas and/or spaces, including their access, shall be maintained free and clear throughout the contract term.

C. Parking for Contractor's employees will be limited to an area (or areas) designated by the Construction Administrator. The Contractor may be required to provide identification stickers for employees' cars.

01015 OCCUPANCY REQUIREMENTS

A. **Full Agency Occupancy During Construction:** The Agency will occupy the site and existing building during the entire construction period. Cooperate with the Agency during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Agency's operations.

1. Provide adequate building and fire code egress from the buildings during the renovation process. The Contractor will be responsible to maintain and protect egress ways during the construction sequence per the design as supplied by the Engineer. Contractor shall be responsible for preparing egress plans for Owner approval and for Office of State Building Official and Office of State Fire Marshal for approval if required.

C. Agency Occupancy:

1. The Construction Administrator will determine whether such occupancy is possible and, if so, will make arrangements for holding a job inspection with the Project Manager, Agency Representative, Owner and General Contractor.
2. A comprehensive list of items to be completed or corrected as issued by the General Contractor, together with the status of completion and terms of occupancy, will be forwarded to the Project Manager and the Owner by the Construction Administrator. A letter will be issued by the Project Manager and Owner to Construction Administrator granting such occupancy and will state the terms and conditions of occupancy.
3. Prior to Agency occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Agency will operate and maintain mechanical and electrical systems serving occupied portions of the building.
4. The Owner will prepare a **"**Certificate of Substantial Completionò for the Work to be occupied prior to Agency occupancy. Use the ñCertificate of Substantial Completionò form as required by the Owner.
5. The Project Manager will request a signed ñCertificate of Complianceò from Commissioner of the Department of Public Works, Owner, and Contractor, if required.

6. A letter from the Project Manager to the Agency Representative with copy to the General Contractor granting occupancy will state the terms and conditions of occupancy and that fire insurance coverage has been requested, the effective date of which will indicate to the Contractor that he may cancel fire insurance coverage for the project.
7. Upon occupancy, the Agency will assume responsibility for maintenance and custodial service for occupied portions of the building.
8. Work after Agency Occupancy:
    a. For all work to complete the occupied building, warranty work, the balancing and commissioning of systems, repair of latent defects and adjustments after occupancy, the contractor is responsible for all costs associated with working in occupied buildings.

01019 CONTRACT CONSIDERATIONS

A. Allowances:

1. The Contractor's costs for unloading and handling, labor, installation costs, storage, insurance, overhead and profit and other expense related to the Allowance item shall be included in the Lump Sum Bid Amount and not in the Allowance unless stated otherwise is the Allowance Schedule of this section.
2. Owner:
    a. Consult with Contractor for consideration of Products, suppliers and installers.
    b. Select Products in consultation with the Project Manager and Agency Representatives and transmit decision to Construction Administrator.
    c. Prepare Change Order.
3. Construction Administrator Responsibilities:
    a. Consult with Owner, Contractor, Project Manager and Agency Representatives for consideration of Products, suppliers and installers.
    b. Select Products in consultation with Owner, Project Manager and Agency Representatives and transmit decision to Contractor
    c. Prepare Change Order.
4. Contractor Responsibilities:
    a. Assist Construction Administrator in selection of Products and Suppliers.
    b. Obtain proposals from Suppliers and offer recommendations.
    c. On notification of selection by Construction Administrator execute purchase agreement with designated supplier.
    d. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
    e. If the actual cost of an Allowance item is more or less than the given amount, the Contract Sum will be adjusted by Change Order.

B. Unit Prices - General:

1. Definition - Unit Price: Amount the General Contractor acknowledges in the Bid Proposal Form as a price per unit of measurement for materials or services as described in the Bidding Documents or in the Contract Documents.
2. Procedures:
    a. 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, engineering, scaffolding, power hookups, protection, shop drawings, taxes, permits, appliances, delivery, insurance, supervision, cost of bond, etc. and shall remain in effect until completion of the Contract.

b. 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.

c. 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 Project Manager, the Undersigned 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.

2. 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.

1. Defect Assessment: Replace the Work, or portions of the Work, not conforming to the specified requirements, If, in the opinion of the Owner it is not practical to remove and replace the work the Owner will direct an appropriate remedy or adjust the payment.

2. Unit Price Schedule: A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials described under each unit price.

01027 APPLICATION FOR PAYMENT

A. **Schedule of Values**: Submit the ñSchedule of Valuesò to the Construction Administrator at the earliest possible date but no later than (21) twenty Calendar Days after the Contract Start Date.

1. Format and Content: Use the Project Manual Table of contents as a guide to establish the format for the ñSchedule of Valuesò. Provide at least one line item for each of the Specification Section on electronic media printout.

2. 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.***

3. Arrange the ñSchedule of Valuesò 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.

d. Name of subcontractor.

e. Name of manufacturer or fabricator.

f. Name of supplier.

g. Retainage.

h. Contract sum in sufficient detail.

4. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
5. 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.
6. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
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.
    a. 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.

B. **Applications for Payment - General:** Each Application for Payment shall be consistent with previous applications and payments as certified by the Owner and Construction Administrator and paid for by the Owner.

1. The initial ñApplication for Paymentò, the ñApplication for Paymentò, at time of ñSubstantial Completionò, and the final ñApplication for Paymentò, involve additional requirements.
2. Payment-Application Terms: The Owner will process monthly progress payments. The Contractor may submit applications for payment on a monthly basis.
3. Payment-Application Forms: Use the ñApplication for Payment" form as required by the Owner. Present the required information on electronic media printout or approved Owner Form, multiple pages should be used if required.
4. For each item, provide a column including but not limited to the following items:
    a. Item Number.
    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.
    f. Materials presently stored.
    g. Total completed and stored to date of application.
    h. Percentage of Completion.
    i. Balance to Finish.
    j. Retainage
5. 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.
    a. Entries shall match data on the ñSchedule of Valuesò.

b. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.

~~6.~~ 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.

a. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Owner.

7. 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:

a. List of subcontractors and suppliersô name, FEIN/Social Security numbers, and Connecticut Tax Registration Numbers.

b. List of principal suppliers and fabricators.

c. Schedule of Values.

d. Contractor's Construction Schedule (preliminary if not final).

e. Schedule of principal products.

f. Submittal Schedule (preliminary if not final).

g. List of Contractor's staff assignments.

h. List of Contractor's principal consultants.

i. Copies of all applicable permits.

j. Copies of authorizations and licenses from governing authorities for performance of the Work.

k. Proof that as-built documents are updated as required by Section 01700 ñContract Closeoutò.

l. Initial as-built survey and damage report, if required.

C. **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.

1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

2. Administrative actions and submittals that shall precede or coincide with this application include, but are not limited to, the following:

a. Occupancy permits and similar approvals.

b. Warranties (guarantees) and maintenance agreements.

c. Test/adjust/balance records.

d. Maintenance instructions.

e. Startup performance reports.

f. Changeover information related to Owner's occupancy, use, operation, and maintenance.

g. Final cleaning.

h. Application for reduction of retainage and consent of surety.

i. Advice on shifting insurance coverage.

j. Final progress photographs.

k. List of incomplete Work, recognized as exceptions to Owner's Certificate of Substantial Completion.

D. **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:

1. Completion of Project Closeout requirements.
2. 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.
4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
5. Transmittal of required Project construction records to the Owner (including as-built documents Reference Section 01700 ñContract Closeoutò.)
6. Removal of surplus materials, rubbish, and similar elements.
7. The requirements of the General Conditions and Supplementary Conditions for Final Acceptance, Final Completion, Final Inspection, and Final Payment.
8. Asbestos, Lead or other hazardous material manifests.

01030 SUPPLEMENTAL BIDS

A. Definition: 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.

1. 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.

B. Procedures:

1. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.
   a. 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. Execute accepted Supplemental Bids under the same conditions as other Work of this Contract.
3. Schedule: A "Schedule of Supplemental Bids" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each Supplemental Bid.

C. Schedule of Supplemental Bids: (NONE IDENTIFIED)

01035 MODIFICATION PROCEDURES

A. Summary: This Section specifies administrative and procedural requirements for handling and processing contract modifications.

B. Requests for Information:

1. 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 Owner, the contractor shall submit a ñRequest for Informationò in writing to the Owner via Construction Administrator. ñRequests for Informationò may only be submitted by the contractor and shall only be submitted on the ñRequest for Informationò forms as required by the owner. In the ñRequest for Informationò, 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 Owner.
   a. In the ñRequest for Informationò, the contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
   b. The owner acknowledges that this is a complex project. Based upon the ownerôs past experience with projects of similar complexity, the owner anticipates that there will probably be some ñRequests for Informationò on this project.
   c. The Owner will review all ñRequests for Informationò to determine whether they are ñRequests for Informationò within the meaning of this term. If it is determined that the document is not a ñRequest for Informationò, it will be returned to the contractor, unreviewed as to content, for resubmittal on the proper form and in the proper manner.
   d. ñRequests for Information Responseò shall be issued within seven (7) Working Calendar 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) Working Calendar Days of receipt of the request, notify the contractor of the anticipated response time. If the contractor submits a ñRequest for Informationò on an activity with seven (7) Working Calendar 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 Owner to respond to the request provided that the Owner responds within the seven (7) Working Calendar Days set forth above.
   e. ñRequests for Information Responseò from Owner will not change any requirement of the contract documents. In the event the contractor believes that the ñRequests for Information Responseò will cause a change to the requirements of the contract document, the contractor shall immediately give written notice to the Construction Administrator stating that the contractor beleives the ñRequests for Information Responseò will result in ñChange Orderò and the Contractor intends to submit a ñChange Order Proposalò request. Failure to give such written notice immediately shall waive the contractorôs right to seek additional time or cost under the requirement these Requirements.

C. Minor Changes in the Work

1. The Owner, through the Construction Administrator, will issue supplemental instruction authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract time, on the ñSupplemental Instructionsò form as required by the Owner.

D. Proposal Request:

1. Owner/Owner-Initiated Requests For Proposals: The Owner 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 ñProposal Requestò form as required by the owner.
2. ñProposal Requestò is issued for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.

3. Within Fourteen (14) Working Calendar Days of receipt of a ñProposal Requestò, submit an ñChange Order Proposalò with the required information necessary to execute the change to the Construction Administrator for the Ownerôs/Owner's review.
4. 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.
    a. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
    b. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.
    c. 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.
    d. 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.

E. Change Order Proposal:

1. When either a ñRequest for Informationò from the Contractor or a ñProposal Requestò from the Owner or Owner results in conditions that may require modifications to the Contract, the Contractor may propose changes by submitting a request for a ñChange Order Proposalò to the Owner via the Construction Administrator on forms as required by the Owner. These forms shall also include ñChange Order Proposal Worksheetsò as required by the Owner.
    a. 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.
    b. 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 ñCompensation for Changes in the Workò of the General Conditions of the Contract for Construction.
    c. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
    d. Comply with requirements in Section 01631 ñEquals and Substitutionsò if the proposed change requires an equal or substitution of one product or system for a product or system specified.
2. 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 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
3. ñChange Order Requestò Forms: Use ñChange Order Proposalò and ñChange Order Proposal Worksheetsò forms as required by Owner.
4. ñChange Order Proposalò cannot be submitted without the Contractor either prior submission of a ñRequest for Informationò from the Contractor or as a response to a ñProposal Requestò submitted by the Owner or Owner.

5. Any ñChange Order Request ò submitted without a prior submittal of a ñRequest for Informationò or as a response to a ñProposal Requestò will be immediately rejected and returned to the Contractor.

F. Construction Change Directive:

1. ñConstruction Change Directiveò: When the Owner and the Contractor disagree on the terms of a ñChange Order Proposalò resulting from either a ñRequest for Informationò or ñProposal Requestò, then the Owner through the Construction Administrator may issue a ñConstruction Change Directiveò on a ñConstruction Change Directiveò as authorized by the Owner on the form required by the Owner. The ñConstruction Change Directiveò instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a ñChange Orderò.
   a. The ñConstruction Change Directiveò 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. Documentation: The Contractor shall maintain detailed records on a time and material basis of work required by the ñConstruction Change Directiveò.
   a. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
   b. The final value shall be negotiated based on the supporting data to determine the value of the work.

G. Change Order Procedures:

1. Upon the Owner's approval of a Contractorôs ñChange Order Proposalò, the Construction Administrator will issue a ñChange Orderò for signatures of the Owner, Owner and the Contractor on ñChange Orderò form as required by the Owner.

01040 COORDINATION

A. Construction Administrator:

1. The Construction Administrator is identified in Division 1 Section 01003 ñConstruction Administratorò.
2. Construction Mobilization:
   a. 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.
   b. During Construction, coordinate use of site and facilities through the Construction Administrator.
   c. Comply with Construction Administrators procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
   d. Coordinate field engineering layout as specified in Section 01050 ñField Engineeringò for work under the instructions of the Construction Administrator.

B. 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.

1. 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.

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.

C. 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.

1. Prepare similar memoranda for the Construction Administrator, Owner and separate contractors where coordination of their work is required.

D. 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:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

E. General Coordination Provisions:

1. Inspection of Conditions: 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.
2. The Contractor shall coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.
3. Coordination Drawings:
   a. The Construction Administrator will review the completed coordination drawing for general compliance and then submit it to the Owner for his review. All subcontractors shall rework the mylar drawings until all systems are properly coordinated.
   b. The Construction Administrator will meet with the Contractor on all major items of coordination.
   c. See also General Conditions Article 7 ñCooperation of Tradesò.

01045 CUTTING AND PATCHING

A. The Contractor shall install sleeves, inserts and hangers furnished by the trades needing same.

B. 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. Permission shall be obtained from the Construction Administrator before cutting beams, arches, lintels or other structural members.

D. 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.

1. Obtain approval from the Ownerôs 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. Miscellaneous structural metals.

f. Equipment supports.

g. Piping, ductwork, vessels, and equipment.

E. Do cutting and patching to integrate all elements of the 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.

F. 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.

G. 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.

H. See also General Conditions Article 23 ñCutting, Fitting, Patching and Diggingò.

01050 FIELD ENGINEERING

A. Provide field engineering services to establish and record grades, lines and elevations.

B. The Contractor shall retain a Professional Engineer or Land Surveyor registered by the State of Connecticut to lay out the building, underground utility lines and other site work from the horizontal and vertical control information furnished by the Owner and to establish and record the necessary elevations, at no additional cost to the State.

C. The Contractor shall forward a letter from his Land Surveyor or Professional Engineer stating that the control information furnished by the Owner, is accurate or shall 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.

01095 REFERENCE STANDARDS & DEFINITIONS

A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. The manufacturers' standard warranties or guarantees shall apply when their products are used on this project.

01120 RENOVATION/DEMOLITION PROJECT PROCEDURES

A. Products For Patching And Extending Work:

1. New materials: As specified in product sections; match existing Products and Work .for patching and extending Work.
2. Type and Quality of Existing Products: Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

A. Inspection- General:

1. Verify that demolition is complete and areas are ready for installation of new Work.

2. Beginning of restoration Work means acceptance of existing conditions.

B. Asbestos – Report available upon request

C. Preparation:

1. Cut, move, or remove items as are necessary for access to alterations and renovation Work. Replace and restore at completion.
2. 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.
3. Remove debris and abandoned items from area and from concealed spaces.
4. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.
5. Close openings in exterior surfaces to protect existing Work and salvage items from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

D. Installation:

1. Coordinate Work of alterations and renovations to expedite completion and if required sequence Work to accommodate Owner occupancy.
2. 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 01045 ñCutting and Patchingò
3. 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 01045 ñCutting and Patchingò
4. In addition to specified replacement of ***equipment*** and ***fixtures***, restore existing ***plumbing, electrical***, systems to full operational condition.
5. Recover and refinish Work that exposes mechanical and electrical Work exposed accidentally during the Work.
6. Install Products as specified in individual sections.

E. Transitions:

1. 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.
2. 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 Owner.

F. Adjustments:

1. 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.
2. Where a change of plane of ¼ inch in **12 inches** or more occurs, request recommendation from Owner for providing a smooth transition.
3. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
4. Fit Work at penetrations of surfaces as specified in Section 01045 ñCutting and Patchingò.

G. Repair of Damaged Surfaces:

1. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing imperfections.

2. Repair substrate prior to patching finish.

H. Finishes:

1. Finish surfaces as specified in individual Product sections.
2. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

I. Cleaning:

1. In addition cleaning specified in Section 01700 ñProject Closeoutò, clean Agency occupied areas of Work

01121 SALVAGEABLE MATERIALS

A. The Contractor shall notify the Construction Administrator in writing (7) seven working Calendar Days prior to removing all salvageable items from the existing alteration project location and unloading all salvageable items at **DCF High Medows**, **Hamden,** Connecticut **06517** and store items in the appropriate location as directed by **Plant Facilites** personnel.

01200 PROJECT MEETINGS

A. Pre-construction Conference:

1. The Contractor will attend a Pre-construction Conference before starting construction, as scheduled by the Construction Administrator convenient to the Owner, Agency, the Construction Administrator, Owner, and Contractor. This meeting will take place within fourteen (14) Calendar Days after the written Notice to Proceed and before the Contract 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.
2. Attendees: Authorized representatives of the Construction Administrator, Owner, Owner, 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.
3. Agenda: Discuss items of significance that could affect progress, including the following:
    - ***a. Tentative construction schedule.***
    - ***b. Critical work sequencing.***
    - ***c. Progress meeting schedule.***
    - ***d. Designation of responsible personnel.***
    - ***e. Procedures for processing field decisions and Change Orders.***
    - ***f. Procedures for processing Applications for Payment.***
    - ***g. Distribution of Contract Documents.***
    - ***h. Submittal of Shop Drawings, Product Data, and Samples.***
    - ***i. Preparation of record documents.***
    - ***j. Use of the premises.***
    - ***k. Parking availability.***
    - ***l. Office, work, and storage areas.***
    - ***m. Safety procedures & evacuation.***

n. First aid.

o. Security.

p. Working hours.

B. Progress Meetings:

1. The Construction Administrator will conduct progress meetings, weekly, at the Project Site. The Construction Administrator will notify the Owner, the Owner, and the Contractor of the scheduled Progress Meeting dates. Coordinate dates of Progress Meetings with preparation of Application for Payment requests.
2. Attendees: In addition to representatives of the Contractor, Construction Administrator, Owner and the Owner, 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.
3. 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.
    a. Construction Schedule: Review progress since the last Progress Meeting. Determine where each activity is in relation to the required Contractor's ñConstruction Scheduleò 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.
    b. Review the present and future needs of each entity present
4. 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.
5. A schedule of regular Project Meetings will be established at the Pre-construction Conference.

01300 SUBMITTALS

A. **Summary:**

1. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including but not limited to the following:

    a. Submittal schedule.

    b. Shop Drawings.

    c. Product Data.

    d. Samples.

    e. Quality assurance submittals.

    f. Proposed "Substitutions Request" form.

    g. Warrantee samples.

    h. Coordination Drawings.

    i. *O & M Manuals*

B. Administrative Submittals: Refer to other Division 1 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 #'s and Connecticut tax registration #.***

C. Definitions:

1. 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 Division 2 through 16.
    a. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
2. 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.
3. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

D. Submittal Procedures:

1. 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.
2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that requires sequential activity.
3. Coordinate each submittal which has long lead times in advance to not to delay project.
4. 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.
5. The Owner reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
6. The Owner reserves the right to reject incomplete submitted packages.
7. 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 resubmittals.
    a. Allow (2) two weeks for initial review. Allow additional time if the Owner 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 (2) two weeks for reprocessing each submittal.

d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Owner sufficiently in advance of the Work to permit processing.

E. **Submittal Preparation:** Place a permanent label, title block or 8-1/2 inches x 11 inches cover page approved by the Owner, 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 at a minimum 7 copies or as determine 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. Submittal Number

d. Name and address of the Owner, Construction Administrator, and Owner Representative.

e. Name and address of the Contractor.

f. Name and address of the subcontractor.

g. Name and address of the supplier.

h. Name of the manufacturer.

i. Number and title of appropriate Specification Section.

j. Drawing number and detail references, as appropriate.

k. Indicate either initial or resubmittal.

l. Indicate deviations from Contract Documents.

m. ***Indicate if "equal" or "substitution".***

F. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Owner using a transmittal form. Copy the Construction Administrator on the transmittal. The Owner 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 Owner 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.

G. Submittal Schedule:

1. After development and review by the Owner and Owner acceptance of the Contractor's Construction Schedule prepare a complete schedule of submittals. Submit the schedule to the Construction Administrator within 30 days of Contract Award.
2. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the Contractorôs Construction Schedule
3. 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 Ownerôs final release of approval.

H. **Distribution:** Following response to the initial submittal, print and distribute copies to the Construction Administrator, Owner, Owner, Agency, 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.

I. **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.

J. Daily Construction Reports

1. 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:

a. List of subcontractors at the site.

b. Approximate count of personnel at the site.

c. High and low temperatures, general weather conditions.

d. Accidents and unusual events.

e. Meetings and significant decisions.

f. Stoppages, delays, shortages, and losses.

g. List of equipment on site and identify if idle or in use.

h. Orders and requests of governing authorities.

i. Change Orders received, start and end dates.

j. Services connected, disconnected.

k. Equipment or system tests and startups.

l. Partial Completion's, occupancies.

m. Substantial Completion's authorized.

n. ***Equals or Substitutions approved or rejected.***

K. Shop Drawings:

1. 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.

2. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:

a. Dimensions.

b. Identification of products and materials included by sheet and detail number.

c. Compliance with specified standards.

d. Notation of coordination requirements.

e. Notation of dimensions established by field measurement.

f. 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.

g. 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.

h. Details shall be large scale and/or full size.

3. 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 Owner, in writing of any deviation in the shop drawings from the requirements of the Contract Documents.

4. The Owner 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 ñSubmittals, Product Date, Shop Drawings and Samplesò of the General Conditions. Shop Drawings received by the Owner 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.

5. The Contractor shall make any corrections required by the Owner and shall resubmit the required number of corrected copies of shop drawings until fully reviewed.

6. Upon final review submit four (4) additional prints, same as submitted, to the Construction Administrator for his use.

7. The Owner's review and comments on shop drawings shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents.

8. Only final reviewed shop drawings are to be used on the project site.

9. 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 Owner shall constitute acceptance by the State and the Owner of a variation or departure that is clearly identified. Final reviewed shop drawings shall not replace or be used as a vehicle to issue or incorporate change orders.

L. Product Data:

1. 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.

2. 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.

3. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
4. Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.
5. Submittals: Submit 7 copies of each required submittal; submit 5 copies where required for maintenance manuals. The Owner will retain one and will return the other marked with action taken and corrections or modifications required.
    a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
6. 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.

M. Quality Assurance Submittals:

1. 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.
2. 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.
    a. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.
3. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."

N. Construction Administrator's Action:

1. Except for submittals for the record or information, where action and return is required, the Owner will review each submittal, mark to indicate action taken, and return promptly.
    a. Compliance with specified characteristics is the Contractor's responsibility.
2. Action Stamp: The Owner will stamp each submittal with a uniform, action stamp. The Owner will mark the stamp appropriately to indicate the action taken, as follows:
    a. Final Unrestricted Release: When the Owner 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.
    b. Final-But-Restricted Release: When the Owner 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.
    c. Returned for Resubmittal: When the Owner 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.

1) Do not use, or allow others to use, submittals marked "Rejected, or Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.

d. Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Owner will return the submittal marked "Action Not Required."

3. Unsolicited Submittals: he Owner will discard unsolicited submittals without action.

01310 CONSTRUCTION SCHEDULE

A. **Definitions**:

1. Construction Schedule: A method of planning and scheduling a construction project utilizing 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.

B. Quality Assurance: The Contractor's Consultant: Retain a consultant to provide planning, evaluating, and reporting by CPM scheduling.

1. In-house Option: The Owner may waive the requirement to retain a consultant if the Contractor can demonstrate that:

a. The Contractor has the computer equipment required to produce construction schedules.

b. The Contractor employs skilled personnel with experience in construction scheduling and reporting techniques.

2. **Program**: Use **"Microsoft Projectò**, latest version.

3. Standards: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

C. Construction Schedule Format:

1. Format: Utilize a horizontal bar chart (gantt) with a separate bar for each major portion of the Work or operation, identifying first work day of each week.

2. Program: Use **Microsoft Project**, latest version.

3. Sequence of Listings: Utilize the Table of Contents of this Project Manual and the chronological order of the start of each item of work.

4. Scale and Spacing: Provide space for notations and revisions.

5. Sheet Size: To be coordinated with Construction Administrator.

D. Content:

1. Show complete sequence of construction by activity, with dates beginning and completion of each element of construction.

2. Identify each item by specification section number.

3. Identify work of separate phases other and other logically grouped activities.

4. Show accumulated percentages of completion of each item, and total percentage of Work completed, as of the first day of each month.

5. Provide separate schedule of submittal dates for shop drawings, product data, and samples, Owner/Agency furnished products and any products identified as under Allowances, and dates reviewed submittals will be required from Owner. Indicate decision dates for selection of finishes.

6. Indicate delivery dates for Owner/Agency furnished products and any products identified as under Allowances.

7. Coordinate content with Schedule of Values specified in Section 01027 ñApplication for Paymentò.

8. Indicate critical path with original baseline indicated.

E. Submittals And Revisions To Schedules:

1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
3. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.
4. An initial bar graph (gantt) schedule is to be prepared by the General Contractor and submitted to the Construction Administrator within seven (7) Working calendar days of award of contract. This schedule is to cover all items of work from the start of the project up to the completion of the project. After review, resubmit required revised data within five (5) Working calendar days. This schedule must be revised monthly and when the actual schedule of significant items varies more than seven (7) Calendar days from the proposed schedule. The critical path with baseline must be indicated.
5. Submit revised Construction Schedules each Application for Payment.
6. Submit four (4) copies of the Construction Schedule to the Construction Administrator..

F. Distribution:

1. Distribute copies of the Construction Schedules to Construction Administrator, Owner, Owner, Subcontractors, suppliers, and DCF.
2. Instruct recipients to promptly report, in writing, problem anticipated by projections indicated in schedules.

01400 QUALITY CONTROL

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, the Owner, through the Construction Administrator, shall provide Fire Alarm Acceptance testing, 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 twenty-four (24), forty-eight (48) hours in advance to the test/inspection as applicable. Costs for these services are not included in the Contract Sum.

1. 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.
2. 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.
    a. Such services include Special Inspections as required by the latest adoption of the ñConnecticut State building Codeò.
    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 document and confirm compliance with the provisions of the Connecticut State Building Code for Special Inspections.

c. Materials and assemblers 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 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 Codes.

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.

1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.

2. The Owner will issue a credit change order to cover all costs incurred related to all re-tests/re-inspection due to non-compliance to the contract documents, including but not limited to the Owners costs and the Consultants 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.

3. 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.

6. 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, Owner 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.

2. 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:

1. When the Contractor notifies the Construction Administrator and/or Testing Agency less than twenty-four (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. Reports of test that are part of the submittal requirements which indicate compliance or non-compliance with the specified standard.

G. See also General Conditions Article 16 ñInspections and Testsò.

H. Submittals:

1. 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.
2. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
3. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
    a. Date of issue.
    b. Project title and number.
    c. Name, address, and telephone number of testing agency.
    d. Dates and locations of samples and tests or inspections.
    e. Names of individuals making the inspection or test.
    f. Designation of the Work and test method.
    g. Identification of product and Specification Section.
    h. Complete inspection or test data.
    i. Test results and an interpretation of test results.
    j. Ambient conditions at the time of sample taking and testing.
    k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
    l. Name and signature of laboratory inspector.
    m. Recommendations on re-testing.

I. Quality Assurance:

1. 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.
    a. 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.

J. Repair and Protection:

1. 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 1 Section "Cutting and Patching."
2. Protect constructions exposed by or for quality-control service activities, and protect repaired construction.
3. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

01530 FIRE PROTECTION

A. 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.

B. 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 2 gallons which shall be in U.L. listed containers. Also provide one 30 B:C fire extinguisher within 75 feet of any point on the roof.

01535 CONSTRUCTION EQUIPMENT

A. 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 Department of Public Works 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 A.G.C. and the standards of the State Labor Department.

B. 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.

01540 BARRIERS AND ENCLOSURES

A. Provide barriers to prevent public entry into construction areas and to protect existing facilities from damage by construction operations.

B. Provide a fence around construction site; equip with vehicular and pedestrian gates with locks.

C. Provide covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.

D. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, materials' dumping, chemically injurious materials, puddling or running water.

E. 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.

F. 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 Department's approval of an alternate egress plan.

G. See also General Conditions Article 19 ñProtection of the Work, Persons and Propertyò.

01545 PROTECTION

A. Protect buildings, equipment, furnishings, grounds and plantings from damage. Any damage shall be repaired or otherwise made good at no expense to the State.

B. 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.

C. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

D. 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.

E. Provide temporary partitions and ceilings to separate work areas from Owner-occupied areas to prevent penetration of dust and moisture into Owner-occupied areas and equipment. Erect framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

F. See also General Conditions Article 19 ñProtection of the Work, Persons and Propertyò.

01550 SECURITY

A. Provide security program and facilities to protect work, existing facilities and Owner's operations from unauthorized entry, vandalism and theft. Coordinate with Owner's security program.

B. The Contractor shall be solely responsible for damage, loss or liability due to theft or vandalism.

01555 TRAFFIC WAYS

A. 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.

B. 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.

C. If the work of the Contract affects public use of any street, road, highway or thoroughfare, the G. C. 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 G.C. will be responsible for payment of any needed police services.

01560 TEMPORARY CONTROLS

A. 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.

6. ***Traffic Control.***

01565 STORM WATER CONTROL

A. Assume responsibility for Storm Water pollution control by submitting to the Connecticut Department of Environmental Protection (DEP) a "General Permit for the Discharge of Storm Water and Dewatering Wastewaters from Construction Activities" registration; conform to the permit requirements.

B. Conform to the Storm Water Pollution Control Plan included in the Contract Documents or have another plan, prepared at the General Contractor's expense, which has been approved by the Department of Public Works and Environmental Protection.

C. The "General Permit for the Discharge of Storm Water and Dewatering Wastewater from Construction Activities" "draft" registration is attached to the technical Section 02115 Water Pollution Control (Soil Erosion).

D. Sign, and cause to be signed by each appropriate subcontractor, the Certification Statement required by the General Permit.

E. Provide, maintain, and monitor a rain gauge on the site; monitoring shall include maintaining a log of the readings. The rain gauge shall remain the property of the General Contractor.

01570 CLEANING

A. Maintain areas under Contractor's control free of waste materials, debris and rubbish. Maintain in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces before closing the space.

C. Periodically clean interior areas before start of surface finishing and continue cleaning on an as-needed basis.

D. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces.

E. Remove waste materials, debris and rubbish from site daily and dispose of legally off-site. No scrap/debris shall remain inside the building or anywhere on site upon final acceptance of the project.

F. See also General Conditions Article 24 ñCleaning Upò.

01585 IDENTIFICATION BADGES

A. Identification Badges for Contractor's Personnel, Visitors & Parking Stickers:

1. 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 assigns, 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 Contractorôs 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.

01600 MATERIALS AND EQUIPMENT CONTROLS

A. 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.

1. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct and products are undamaged.
2. Packages, materials and equipment showing evidence of damage will be rejected and replaced at no additional cost to the Owner.

B. Storage and Protection:

1. Store products in accordance with manufacturers' instructions with seals and labels intact and legible. Store sensitive products in weathertight enclosures; maintain within temperature and humidity range required by manufacturer.
2. 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.
3. Store loose granular material on solid surfaces in a well-drained area; prevent mixing with foreign matter.
4. 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.
5. Stone, masonry units and similar materials shall be stored on platforms or dry skids and shall be adequately covered and protected against damage.
6. The Contractor shall prepare, as directed by the Owner, one area or space in the building for storage of State-owned equipment.

01631 EQUALS AND SUBSTITUTIONS

A. Definitions: Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

1 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.

2 Equal: 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 Owner 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 Ownerôs design intent of the specified material, device, procedure, equipment, etc.

3 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 Owner and may be rejected or approved by the Owner. The Substitution is not equal to the specified requirement in comparison to the first manufacture 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 Ownerôs design intent of the specified material, device, procedure, equipment, etc.

4 The following are not considered to be requests for Equals or Substitutions:

a. Revisions to the Contract Documents requested by the Owner or Owner.

b. Specified options of products and construction methods included in the Contract Documents.

c. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities having jurisdiction.

B. Submittals:

1. Equals and Substitution Request Submittals: The Owner will consider requests for equals or substitutions if received within time period designated in the General Conditions Article 15 ñMaterials; Standardsò. Requests received more than the days specified in Article 15 after the start date of the contract will be rejected.

a. The Contractor is required to prepare and submit 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 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 Owner to determine that the proposed Equal or Substitution is or is not substantially equal to the first listed manufacturer or procedure.

2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.

3. Provide complete documentation showing compliance with the requirements for equals or substitutions, and the following information, as appropriate on a ñSubstitution Requestò form as required by the Owner:

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.

4. Owner's Action: If necessary, the Owner will request additional information or documentation for evaluation within one week of receipt of the original request for equal or substitution request. The Owner will notify the Construction Administrator who will notify the Owner of recommended acceptance or rejection of the proposed equal or substitution, within two (2) weeks of receipt of the request, or one (1) week 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 one (1) week after notification.

   a. Any request deemed an "Equal" and accepted by the Construction Administrator, Owner, Owner, and Agency will result in written notification to the Contractor and will not be in the form of a change order for an "Equalò.

   b. Any request deemed a "Substitution" and rejected or approved by Construction Administrator, Owner, and Owner may result in written notification to the Contractor and may be in the form of a change order if the ñSubstitutionò is approved.

C. Equal or Substitutions:

1. Conditions: The Owner 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 Owner. If the following conditions are not satisfied, the Owner will return the requests to the Construction Administrator without action except to record noncompliance with these requirements.

   a. The proposed request does not require extensive revisions to the Contract Documents.

   b. The proposed request is in accordance with the general intent of the Contract Documents.

   c. The proposed request is timely, fully documented, and/or properly submitted.

   d. The proposed request can be provided within the Contract Time. However, the Owner will not consider the proposed request if it is a result of the Contractorôs failure to pursue the Work promptly or coordinate activities properly.

   e. 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 Owner 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.

   f. The proposed request can receive the necessary approvals, in a timely manner, required by governing authorities having jurisdiction.

   g. The proposed request can be provided in a manner that is compatible with the Work as certified by the Contractor.

   h. The proposed request can be coordinated with the Work as certified by the Contractor.

   i. The proposed request can uphold the warranties required by the Contract Documents as certified by the Contractor.

2. The Contractor's submission and the Owner's review of Submittals, including but not limited to, Samples, Manufacturerôs 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.

01650 STARTING OF SYSTEMS

A. General:

1. Coordinate schedule for start-up of various equipment and systems such as sanitary sewer pump stations, water pump station, sanitary sewer maceration unit and sewer meter.
2. Provide written notification the Construction Administrator fourteen (14) Calendar Days prior to start-up of each item.
3. 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.
4. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
5. Verify in wiring and support components are complete and tested.
6. Execute the start-up under supervision of manufacturerôs representative, in accordance with manufacturerôs instructions.
7. 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.
8. Submit a written report in accordance Section 01400 ñQuality Controlò that the equipment or system has been properly installed and is functioning properly.

B. Demonstration and Instructions:

1. Demonstrate operation and maintenance of Products to Owner and Agency Personnel two (2) weeks prior to substantial completion.
2. Demonstrate Project equipment and instruct in a classroom environment at location designated by the Construction Administrator and instructed by a qualified manufacturerôs representative who is knowledgeable about the project.
3. For equipment or systems requiring seasonal operation perform demonstration for season within six (6) months.
4. 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.
5. 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.
6. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during demonstration.

C. Testing Adjusting, and Balancing:

1. The Contractor will employ and pay for the testing services of an independent consultant to verify the testing, adjusting, and balancing.
2. 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.
3. 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.

01700 CONTRACT CLOSEOUT

A. Substantial Completion:

1. Preliminary Procedures: Before requesting inspection for Certification of Substantial Completion, complete the following. List exceptions in the request.
    a. 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.
        1) Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
        2) 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.

    b. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
    c. Submit record drawings, maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
    d. Demonstration, 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.
2. Inspection Procedures: The Contract shall be ready and prepared when they request a Substantial Completion inspection. If the inspection reveals that the work is not complete, there are extensive punchlist items and as the items listed above are not complete, the Construction Administrator, Owner, and Owner will determine the inspection has failed.
3. 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.
    a. The Owner will repeat inspection when requested and assured that the Work is substantially complete.
    b. Results of the completed inspection will form the basis of requirements for final acceptance.

B. Final Acceptance:

1. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.
    a. 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.
    b. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
    c. Submit a certified copy of the Owner's final inspection list of items to be completed or corrected, endorsed and dated by the Owner. 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 Owner.
    d. 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.
    e. Submit consent of surety to Final Payment.
    f. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

2. Reinspection 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.

    a. Upon completion of reinspection, the Construction Administrator will prepare a certificate of final 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.

C. As Built Document Submittals:

1. General: Do not use record documents for construction purposes. Protect Record Documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Owner's reference during normal working hours. Keep documents current; do not permanently conceal any work until required information has been recorded. **Failure to keep documents current is sufficient cause to withhold progress payments.**

a. 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

b. 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.

2. **As-built Drawings:** The Contractor shall maintain one 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.

    a. Mark record sets with erasable pencil to distinguish between variations in separate categories of the Work.

    b. Mark all new information that is not shown on Contract Drawings.

    c. Note related change-order numbers where applicable.

    d. 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.

    e. 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 Owner or Engineer for transferring the changes to the Record Drawing Mylar Tracings.

    f. Submit electronic format data of all Coordination Drawings as required by the owner, at no additional cost.

    g. Refer to Section 01400 ñQuality Controlò Section 1.3 for required as built drawings.

3. **Record Sample Submitted:** Immediately prior to Substantial Completion, the Contractor shall meet with the Construction Administrator, Owner 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.

4. **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.

5. **Maintenance Manuals:** Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch (51-mm), 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder according to section 01730 ñOperations & Maintenance Dataò. Included but not limited to the following types of information:

   a. Emergency instructions.

   b. Spare parts list.

   c. Copies of warranties.

   d. Wiring diagrams.

   e. Recommended "turn-around" cycles.

   f. Inspection procedures.

   g. Shop Drawings and Product Data.

D. Closeout Procedures:

1. 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:

   a. Maintenance manuals.

   b. Record documents.

   c. Spare parts and materials.

   d. Control sequences.

   e. Cleaning.

   f. Warranties and bonds.

   g. Maintenance agreements and similar continuing commitments.

2. As part of instruction for operating equipment, demonstrate the following procedures:

   a. Startup.

   b. Shutdown.

   c. Emergency operations.

   d. Noise and vibration adjustments.

   e. Safety procedures.

   f. Economy and efficiency adjustments.

   g. Effective energy utilization.

E. **Final Cleaning**:

1. **General**: The General Conditions requires general cleaning during construction. Regular site cleaning is included in Division 1 Section 01570 ñCleaningò".

2. Employ experienced workers or 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.

3. **Interior:**
   a. Remove labels that are not permanent labels.
   b. 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
   c. 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.
   e. Clean and polish finish hardware.
   f. Clean floors.
   g. Vacuum and/or dust walls, ceilings, lighting fixtures, and other wall and ceiling items.
   h. Remove defacements, streaks, fingerprints and erection marks.
4. **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.
   c. Remove waste and surplus materials, rubbish and construction equipment and facilities from the site, and deposit it legally elsewhere.
   d. 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.
5. **Removal of Protection:** Remove temporary protection and facilities installed for protection of the Work during construction.
6. **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.
   a. 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.
   b. 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.

01730 OPERATION AND MAINTENANCE DATA

A. The Contractor shall instruct the State's designated personnel in the operation of new equipment and shall provide manuals and if required, provide video tapes of this basic maintenance of the equipment for training purposes. Provide qualified personnel for as long as necessary to instruct the State's personnel.

B. Submit four copies of the manuals in 3-ring, loose-leaf notebooks to the Owner for approval. Manuals may consist of plain paper copies of approved shop drawings and catalog cuts. Upon completion and approval, 3 copies will be forwarded to the State and one copy retained by the Owner.

C. Manuals shall include:

1. Operating Procedures:

a. Typewritten procedures for each mode of operation of each piece of equipment. Procedures shall indicate the status of each component of a system in each operating mode.

b. Procedures shall include names, symbols, valve tags, circuit numbers, schematic wiring diagrams, locations of thermostats, manual starters, control cabinets and other controls of each system.

D. Emergency shut-down procedures for each piece of equipment or system, both automatic and manual, as appropriate.

1. Maintenance Schedule:

a. Typewritten schedule describing manufacturers schedule of maintenance and maintenance procedures.

2. Catalog Cuts:

a. To illustrate each piece of installed equipment, including options.

b. Include equipment descriptions including physical, electrical and mechanical; performance characteristics; installation or erection diagrams.

c. Include spare parts numbers and names, address and phone number of manufacturer; name, address and phone number of local representative or service department.

d. Typewritten list of all subcontractors on the project, including name, address and phone number of local representative or service department.

3. Manuals shall be indexed with dividers indicating each system or piece of equipment.

01740 WARRANTIES AND GUARANTEES

A. **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.

B. **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.

C. **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.

D. **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.

E. **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.

1. 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.

F. 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.

G. The Contractor shall guarantee all materials and workmanship for a period of eighteen months from the date of acceptance of the Work. In addition, the Contractor shall furnish the warranties listed below. Submit four 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.

H. The Contractor shall guarantee all materials and workmanship for a period of eighteen months from the date of acceptance of the Work. In addition, the Contractor shall furnish the warranties listed below. Submit four 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.

I. Submit certification that finish materials are fire rated as specified.

J. Form of Guarantees and Warranties:

Commissioner
Department of Public Works
165 Capitol Avenue
Hartford, Connecticut 06106
(Project Title and Number)

I (We) hereby guarantee and warranty)

the _____ work on the referenced project for a period of _____ years

from _____, 19___ against failures of workmanship and materials in accordance

with the requirements of Section ____, Page ____, Paragraph ____, of the Specifications.

Signed _____

3) General Contractor _____
(or authorized agent)

K. Bonds shall be by approved Surety Companies, made out to the Commissioner, Department of Public Works on companiesô standard form.

L. Guarantees, warranties or bonds supplied by Subcontractors, 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 Contractor.

M. **Submittals**:

1. Submit written warranties prior to the date certified for Substantial Completion. If the Owner'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 Owner.

2. 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.

a. Refer to Divisions 2 through 17 Sections for specific content requirements and particular requirements for submitting special warranties.

3. Form of Submittal: At Final Completion compile 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.

4. 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 (115-by-280-mm) paper.

   a. 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.

   b. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.

   c. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF DIVISION 1- GENERAL REQUIREMENTS

SECTION 03300

CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION

A. The extent of concrete work is shown on drawings.

B. Concrete curbs, gutters and walkways are included.

C. Concrete curing and sealing is included.

D. Concrete equipment bases as required.

1.02 QUALITY ASSURANCE

A. Comply with the current edition of the following codes, specifications and standards:

1. ACI 301 "Specifications for Structural Concrete for Buildings".
2. ACI 302.1R ñGuide for Concrete Floor and Slab Constructionò.
3. ACI 304 "Guide for Measuring, Mixing, Transporting and Placing Concrete".
4. ACI 318 ñBuilding Code Requirements for Reinforced Concreteò.
5. ACI 117 ñSpecifications for Tolerances for Concrete Construction and Materials.
6. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".
7. Floor slabs must be designed to support a minimum 100 PSF live load.
8. ASTM E 1155-96 ñStandard Test Method for Determining Floor Flatness and Levelness Using the F-Number Systemò.
9. ASTM F-1869-98 ñTest Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chlorideò
10. ASTM C979-99 Pigments for Integrally Colored Concrete.
11. ASTM E 96-00 ñStandard Test Methods for Water Vapor Transmission of Materialsò.
12. ASTM E 154-99 ñStandard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabsò.
13. ASTM E 1643-98 ñStandard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under concrete Slabsò.
14. ASTM E 1745-97 ñStandard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabsò.

B. Testing: Employ at the Landlords expense, a testing laboratory, acceptable to Walgreens, to perform the following testing. Slump, air content and temperature tests must be performed with each set of compression test cylinders.

1. Compressive strength testing. Comply with ASTM C 31, ASTM C172-99, ASTM C39, and as follows:
   a. Provide 4 cylinders minimum from each dayôs pour.

   b. Provide 4 cylinders for each fifty- (50) cubic yards or fraction thereof poured on each date for slabs and foundations. Provide 4 cylinders for each one-hundred fifty (150) cubic yards or fraction thereof poured on each date for concrete paving and sidewalks.

   c. Samples shall be tested and reports provided for concrete samples at 7 days, 28 days and 56 days.

2. Slump testing: Comply with ASTM C143.

3. Flatness/Levelness Testing. Comply with ASTM E-1155, but provide a minimum of one line of sampling in two perpendicular directions through each structural bay.
   a. Perform testing using a ñDipstick Profilerò within 72 hours of concrete placement.

PART 2 - PRODUCTS

2.01 FORMWORK

A. Construct formwork for all concrete, with plywood, metal or other panel-type materials to provide continuous, straight, smooth surfaces.

B. For site concrete: Use steel, wood or other suitable materials, free of distortion/defects of size/strength to resist movement and maintain vertical and horizontal alignment during placement.

1. Curves shall be uniform and free of form marks.

C. Form coatings: Use non-staining release agents that will not discolor, deface or impair finish or treatment of concrete.

2.02 REINFORCEMENT

A. Reinforcing Bars: ASTM A 615, grade 60, deformed.

B. Epoxy - Coated Reinforcing Bars: ASTM A 775.

C. Welded Wire Fabric Reinforcement: ASTM A 185 welded steel wire fabric, sheets only, rolled fabric prohibited.

D. Reinforcement supports: Use chairs, spacers & bolsters complying with CRSI.

1. For slabs on grade use reinforcing support to ensure proper clearance/cover. Do not pull reinforcing through placed concrete.

E. Joint Filler: Provide preformed joint filler at slab expansion joints, joints between floor slabs and walls and other isolation joints. Provide one of the following:

1. Precompressed, impregnated open cell foam.
2. Asphalt saturated fiberboard complying with ASTM D 1751.
3. Granulated cork between saturated felt or glass fiber felt complying with ASTM D 1752 type H.

2.03 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I

B. Fly Ash: ASTM C 618, Type C or F, not to exceed 25% of cement content by weight. Do not use when ambient air temperatures are expected to be below 35 degrees F during the first 48 hours after placement.

C. Aggregates: Normal weight: ASTM C 33 Light weight: ASTM C 330.

D. Water: Drinkable

E. Air Entraining Admixture: ASTM C 260.

F. Calcium Chloride: Any admixtures containing more than 0.1% chloride ions content by weight are not permitted.

G. Water Vapor Retarder: Decay resistant materials complying with ASTM E 96 not exceeding 0.04 perms, ASTM E 154 and ASTM E 1745 Class C. Provide polyethylene sheet not less than 10 mils thick, Raven Industries ñVaporBlock 10, Stego Industries 10 mil ñStego Wrap™ò or W.R. Meadows Sealtight 10 mil ñVapor-Matò

H. Chemical Hardener: Colorless solution of magnesium fluosilicate, zinc fluosilicate and wetting agent containing not less than 2 lb. fluosilicates per gallon. Acceptable Products: Sonneborn, Lapidolith®, Dayton Superior, and Day-Chem HardenerÊ .

I. Chemical Admixtures: Type A water-reducing, Type F and Type G high-range water-reducing admixtures shall comply with ASTM C494. Do not use in cold weather conditions.

2.04 CONCRETE DESIGN/PROPORTIONING

A. Provide normal weight concrete as required by drawings as follows:

1. 3,000 PSI minimum 28 day compressive strength or stronger as required by architect/engineer of record.

B. Air Entrainment: Use air-entraining admixture resulting in concrete with air content at point of placement as follows:

1. Concrete exposed to freezing/thawing, deicer chemicals, or hydraulic pressure:

4.5% (moderate exposure); 5.5% (severe exposure) 1-1/2" max. aggregate.

4.5% (moderate exposure); 6.0% (severe exposure) 1" max. aggregate.

5.0% (moderate exposure); 6.0% (severe exposure) 3/4" max. aggregate.

5.5% (moderate exposure); 7.0% (severe exposure) 1/2" max. aggregate.

2. Other Concrete: 2% to 4% air.

C. Water-Cement Ratio: Provide concrete with maximum water-cement (WC) ratios as follows:

Subjected to freezing and thawing; WC 0.50. Subjected to deicers/watertight; WC 0.45.

D. Slump Limits: Provide concrete with slump at point of placement as follows:

Ramps and sloping surfaces: Not more than 3".

Reinforced foundation systems: Not less than 1" and not more than 4".

Slabs and other concrete: Not more than 4".

E. Portland Cement Paving, Sidewalks and Curbs: 3,000 psi after 28 days curing.
Air Entrainment: 4% to 7%.
Slump: 3ò.
Water/Cement Ratio: Per article 2.04.C above.

2.05 MISCELLANEOUS MATERIALS

A. Accessible Ramps: Impart color with integrally colored concrete. Provide Integral Red Color: (for accessible ramps) Natural or synthetic mineral oxides complying with ASTM C-979 blended at batch plant. Acceptable Products: Bayferrox iron oxide pigment by Bayer Corp., color #110 (4 lbs.).
Davis Colors, Mix-Ready®, color Baja Red #160 (2 lbs.).
Chromix®by L.M. Scofield Co., color C-22 Coral Red.

PART 3 - EXECUTION

3.01 REINFORCEMENT

A. Clean reinforcement of rust, mill scale, ice or materials which will reduce bond with concrete.

B. Place reinforcement to obtain proper concrete coverage.

3.02 CONCRETE PLACEMENT

A. Place concrete on/in properly prepared sub-base or forms. Place concrete slabs directly on water vapor retarder. Provide not less than 6 inches of prepared granular sub-base between water vapor retarder and ground .
1. Install water vapor retarder in compliance with ASTM E 1643.
2. Lap joints 6 in. and seal with manufacturers adhesive or tape.
3. Seal around all penetrations with manufacturers pipe boot or by wrapping with vapor retarder and taping.
4. Repair all punctures and cuts using vapor retarder material lapped 6 inches beyond damaged area and taped.

B. Construct slabs to correct level, maintain reinforcing in proper position.

1. Float slabs with a highway straight edge in lieu of a conventional bull float.

C. Do not place concrete on/in frozen sub-base or forms.

D. Pumping Concrete: Concrete may be placed by pumping if first approved in writing by the Architect/Engineer of Record for the proposed location. Pumped concrete shall only be placed in the presence of the Landlords Testing/Inspecting Agent.

1. Equipment: Pumping equipment shall be of the size and design that ensures a continuous flow of concrete at the delivery end without separation of materials. Do not pump concrete through aluminum pipes.

2. Concrete Mix: Shall conform to the architect of recordôs specified design requirements, except that mix may contain chemical admixtures to allow proper pumping. Include the specified high-range or mid-range water reducing admixture in the mix. Unless strictly controlled and anticipated in the development of the design mix, the addition of admixtures at the job should be prohibited.

3.03 JOINTS

A. Contraction joints at interior slabs may be formed by saw cuts within 4 to 12 hours after finishing and before random shrinkage cracks form. Concrete surface shall not be torn or damaged by the blade. Joint spacing shall not exceed 36 times the slab thickness. Joint patterns shall be generally square.

B. Isolation joints; provide full depth at all locations where slabs adjoin walls, columns, foundations, drain piping, sprinkler mains, existing concrete or pavement. and other immovable objects.

C. Site concrete; at concrete pavements and curbs, provide contraction joints at 12ô O.C. max. Joint patterns in pavements and sidewalks shall be generally square. At curbs provide full depth expansion joints at 20-ft. O. C. max. At sidewalks provide weakened plane contraction joints not more than 5'-0" max. and expansion joints at 20-ft. O.C max. Tool all edges. Install self-leveling sealant at all isolation/expansion joints.

3.04 FINISHING/CURING

A. Provide a floor surface which is true and level and achieves ñF Numbersò of F_F = 30 and F_L = 20 minimum overall composite and F_F = 20 and F_L = 15 minimum at any individual section, when tested in accordance with ASTM E 1155. Remove surface irregularities to provide a continuous smooth finish.

B. All interior slabs to receive a smooth trowel finish.

B. Apply non-slip broom finish to exterior platforms, walks, steps, ramps and curbs.

Tool all edges to 1/2" radius unless noted otherwise.

D. Apply concrete hardener to exposed interior floors and exterior slab at recessed entrance.

E. Floors to receive resilient flooring shall limit moisture vapor emission to not more than 3 pounds per 1,000 square feet per 24 hours, in compliance with ASTM F-1869.

3.05 REPAIRS

A. Repair or replace broken, defective and stained concrete, and replace non-conforming concrete, all as directed by Architect.

END OF SECTION 03300

SECTION 04300
UNIT MASONRY ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: The Work of this Section includes, but is not limited to, the following:

1. Exterior extruded, clay-type face brick, as indicated.
2. Interior and exterior concrete masonry units, as indicated.
3. Glass block.
4. Bluestone sills.
5. Installation of steel lintels, angles and other supports/assemblies built into masonry construction.
6. Mortar, grout, masonry joint reinforcement, ties, cavity wall insulation, anchors, flashings, termination bars, open head-type weeps and vents, control joints and backer materials and other miscellaneous masonry accessories.

1.02 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops the following net-area compressive strengths (f'm) at 28 days. Determine compressive strength of masonry from net-area compressive strengths of masonry units and mortar types according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1. For Concrete Unit Masonry: f'm = 1,900 psi (minimum).
2. Brick Unit Masonry: f'm = 5,500 psi. average.

1.03 SUBMITTALS

A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.

B. Shop Drawings: Show installation details for the following:

1. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

2. Special Shapes: Provide detailed shop drawings of special shape unit masonry.

C. Setting Drawings: Provide setting drawings for special shape unit masonry; drawings shall show coursing and other conditions critical to the installation of the

Work.

D. Samples for Initial Selection: For the following:

1. Unit masonry Samples in small-scale form showing the full range of colors and textures available for each different exposed masonry unit required.

2. Colored mortar Samples showing the full range of colors available.

E. Samples for Verification: For the following:

1. Full-size units for each different exposed brick masonry unit, including special shapes, required; showing the full range of exposed colors, textures, and dimensions to be expected in the completed construction.

2. Colored mortar Samples for each color required, showing the full range of colors expected in the finished construction. Make samples using the same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.

3. Accessories embedded in the masonry.

F. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.

1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents, unless such deviations are specifically brought to the attention of the Architect and approved in writing.

G. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with requirements indicated. Manufacturerôs material test reports of materials identical to those specified, which have been performed within the last 12 months, will be considered current subject to acceptance of the Architect. As follows:

1. Each type of masonry unit required.

a. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances.
b. Include test results, measurements, and calculations establishing net-area compressive strength of masonry units.

2. Mortar complying with property requirements of ASTM C 270.

3. Grout mixes complying with compressive strength requirements of ASTM C 476. Include description of type and proportions of grout ingredients.

I. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:

1. Each type of masonry unit required. Include size-variation data for brick, verifying that actual range of sizes falls within specified tolerances, and test data, measurements, and calculations establishing net-area compressive strength of masonry units.
2. Each cement product required for mortar and grout, including name of manufacturer, brand, type, and weight slips at time of delivery.
3. Each combination of masonry unit type and mortar type. Include statement of net-area compressive strength of masonry units, mortar type, and net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
4. Each material and grade indicated for reinforcing bars.
5. Each type and size of joint reinforcement.
6. Each type and size of anchor, tie, and metal accessory.

1.04 QUALITY ASSURANCE

A. Preconstruction Testing: Employ and pay a qualified independent testing agency to perform the following preconstruction testing to establish compliance of proposed materials and construction with specified requirements:

1. Concrete Masonry Unit Test: For each different concrete masonry unit indicated, test units for strength, absorption, and moisture content per ASTM C 140.
2. Evaluate mortar and grout composition and properties per ASTM C 780.
3. Test grout compressive strength per ASTM C 1019.

B. Fire-Resistance Ratings: Where indicated, provide materials and construction identical to those of assemblies with fire resistance ratings determined per ASTM E 119 by a testing and inspecting agency, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

C. Codes and Standards: Comply with the requirements of the following for bearing wall and masonry construction:

1. American Concrete Institute (ACI) 530-95 Building Code Requirements for Masonry Structures.
2. ACI 530.1-95 Specifications for Masonry Structures.

D. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each different type and finish of masonry product required.

E. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

F Sample Panels: Before installing unit masonry, build sample panels, using materials indicated for the completed Work; including back-up wythes, accessories, control joints, open head weep and vent hole, etc. Mock-ups are to verify selections made under sample submittals and to demonstrate aesthetic effects and workmanship. Build sample panels for each different type, color and pattern of exposed masonry construction; mock-ups shall be job-site built utilizing all materials proposed for the final units of work, and shall be approximately 48 inches long by 48 inches high by full thickness, unless otherwise directed by the Architect.

1. Locate panels in the locations indicated or, if not indicated, as directed by Architect.
2 Clean exposed faces of panels with masonry cleaner indicated.
3. Protect approved sample panels from the elements with weather-resistant membrane.
4. Maintain sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.

    a. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels, unless such deviations are specifically approved by Architect in writing.

6. Maintain and protect acceptable mock-ups in an undisturbed condition throughout the remainder of construction, and until such time as demolition is directed by the Architect.

G. Preinstallation Conference: The Contractor, or the Representative assigned by the Contractor shall conduct a conference at Project site, with the masonry contractor, and other trade contractors whose work is related to the masonry work. Review the conditions of construction, materials to be built into masonry and coordination required between trades affected by the masonry work. The

Contractor shall write and distribute minutes to parties present and all others affected by the work of this section.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.06 PROJECT CONDITIONS

A. Protection of Masonry: During construction, 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 inches down both sides and hold cover securely in place.

B. Do not apply uniform loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. 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 from 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 onto completed masonry.

D. 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 unit masonry damaged by frost or by freezing conditions. Comply with cold-

weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602 and the recommendations of The Brick Institute of America (BIA). If requirements and/or recommendations contradict each other, the more stringent requirement(s)/recommendation(s) shall prevail.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. 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.

1. When ambient temperature exceeds 100 deg F, or 90 deg F with a wind velocity greater than 8 mph, do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering masonry products which may be incorporated in the Work include but are not limited to the following:

1. Clay Face Brick:

   Glen Gery Corporation.
   The Belden Brick Co.
   Boral Brick.

2. Concrete Masonry Units:

   E.P. Henry Corporation
   Trenwyth Industries Inc.
   Oldcastle Architectural Products Group.

3. Masonry Reinforcing, Ties and Accessories:

   Hohmann & Barnard, Inc.
   Heckman
   Dur-O-Wall

2.02 FACE BRICK

A. General: Provide shapes indicated and as follows for each form of brick required:

1. Provide brick units, of each type, matching the approved Architectôs samples. Brick units shall be installed in accordance with the approved shop drawings; with all cores, frogs and similar manufacturing marks concealed in the finished work.

2. Where brick units will be exposed on more than just the units face, provide units with such surfaces finished identically matching the face brick (including tops, bottoms, ends and edges) so that exposed brick surfaces/assemblies are free of unfinished brick surfaces.

B. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.

C. Face Brick: ASTM C 216, Grade SW, Type FBX, and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of not less than 5,500 psi.
2. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested per ASTM C 67.
3. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
4. Sizes: Provide standard units measuring 3-5/8" x 2-1/4" x 7-5/8", unless otherwise indicated.
5. Application: Exterior face brick, and as indicated on the Drawings.
6. Colors: Provide color matching Architect's samples.
7. Textures: Provide finished face bricks matching the Architectôs sample.

2.03 CONCRETE MASONRY UNITS

A. General: Provide shapes indicated and as follows for each form of concrete masonry unit required.

1. Provide special shapes and other special shapes for lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.

2. Provide radius-edged units for outside corners, unless otherwise indicated.

B. Concrete Masonry Units, Typical Applications: ASTM C 90 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi, unless otherwise indicated.

2. Weight Classification: Lightweight, unless otherwise indicated Structural Drawings; and acceptable to the Architect.

3. Provide Type I, moisture-controlled units.

4. Size: Manufactured to the actual dimensions indicated on Drawings within tolerances specified in the applicable referenced ASTM specification.

   a. Provide 4ò veneer block units, as indicated on the Drawings.

5. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.\

   a. Standard Pattern, Split-face Finish: Where indicated or directed by the Architect, provide 4 inch split-face block.

C. Concrete Building Brick: ASTM C 55 and as follows:

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 3,500 psi., unless otherwise indicated.

2. Weight Classification: Matching the concrete masonry unit construction to which the concrete bricks are to incorporated.

3. Provide Type I, moisture-controlled units.

4. Size: Manufactured to specified dimensions within tolerances specified in the applicable referenced ASTM specification as follows:

5. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

GLASS UNIT MASONRY

A. Solid Glass Block: Semitransparent blocks with smooth outer faces made by fusing together two solid slabs of clear, colorless glass with manufacturer's standard white-colored translucent, polyvinyl-butyral-based coating factory applied on edge surfaces. Dimensions as indicated or required to match existing.

1. Provide clear finish block. Match existing units as closely as possible for material finish, description, color and dimensions.

STONE

A. Bluestone Building Stone Standard: ASTM C 616, classification as follows:

1. Classification: I; Sandstone.

B. Finish of Bluestone: Honed, unless otherwise indicated.

C. Subject to compliance with requirements, provide hard, fine grain bluestone which meet or exceed the following performance criteria:

1. Abrasion Resistance, Absorption and Compressive Strength: As indicated based on product selections.

D. Provide stone with flat, matte surface that is consistent throughout and that is free of rust spots and other undesirable blemishes.

1. Where indicated, cut Bluestone for other ornamental shapes as directed by the Architect.

2.06 MORTAR AND GROUT 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.

B. Hydrated Lime: ASTM C 207, Type S.

C. Aggregate for Mortar: ASTM C 144; except for joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

1. White-Mortar Aggregates: Natural white sand or ground white stone.

D. 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 masonry mortar. Provide one of the following:

1. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
2. Davis Colors; True Tone Mortar Colors.
3. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.

E. Water: Potable.

F. Available Manufacturers: Subject to compliance with requirements, manufacturerôs offering mortar and grout materials that may be incorporated into the Work include, but are not limited to, the following:

1. Lehigh Portland Cement Co.
2. Blue Circle Cement.
3. Lafarge Corporation.

2.05 MASONRY JOINT REINFORCEMENT

A. General: Provide joint reinforcement formed from the following:

1. Exterior: Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
2. Interior: Mill-Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 641, Class 1 coating.

B. Description: Welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:

1. Wire Diameter for Side Rods: 3/16 inch.
2. Wire Diameter for Cross Rods: 3/16 inch.

C. For single-wythe masonry, provide type as follows:

1. Ladder design with cross rods spaced not more than 16 inches o.c.

D. For multi-wythe masonry, provide type as follows

1. Adjustable (two-piece) type, either ladder or truss design, with one side rod at each face shell of backing wythe and with separate ties that extend into facing wythe. Ties have two hooks that engage eyes in reinforcement and resist movement perpendicular to wall. Ties extend at least halfway through facing wythe but with at least 5/8-inch cover on outside face. Ties have hooks to engage a continuous horizontal wire in the facing wythe.

E. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.188-inch-diameter, hot-dip galvanized, carbon-steel continuous wire.

1. Provide high-impact rigid P.V.C. seismic clip assemblies.

2.06 REINFORCING STEEL

A. General: Provide uncoated steel reinforcing bars complying with ASTM A615/A615M, Grade 60.

1. Refer to the Drawings and Schedules for bar sizes, spacing, locations and other requirements.

2.07 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in subsequent paragraphs that are made from materials that comply with eight subparagraphs below, unless otherwise indicated. Comply with requirements of the structural Specification Sections within the Contract Documents

1. Mill-Galvanized, Carbon-Steel Wire (Interior Only): ASTM A 82; with ASTM A 641, Class 1 coating.
2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82; with ASTM A 153, Class B-2 coating.
3. Galvanized Steel Sheet (Interior Only): ASTM A 653, Commercial Steel, G60Z180 zinc coating.
4. Steel Sheet, Galvanized after Fabrication: ASTM A 1008, Commercial Steel, hot-dip galvanized after fabrication to comply with ASTM A 153.
5. Steel Plates, Shapes, and Bars: ASTM A 36.

B. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches parallel to face of veneer.

1. Adjustable Anchors for Connecting to Structure: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

    a. Steel Frame Connections: Provide the following:

        i) Anchor Section for Welding to Steel Frame: Crimped 1/4-inch-diameter, galvanized-steel wire.

        ii) Tie Section for Steel Frame: Triangular-shaped wire tie, made from 0.188-inch- diameter, galvanized-steel wire.

    b. Connector Connections: Provide the following:

        i) Anchor Section for Concrete: Rib-stiffened, sheet metal plate with screw holes top and bottom, 3/4 inches wide by 7 inches high by 12 gage thick stainless steel; with projecting tabs for inserting vertical legs of wire tie specially formed to fit anchor section. Provide the manufacturerôs standard hot-dip galvanized steel fasteners with neoprene sealing washers.

        ii) Tie Section for Concrete: Triangular-shaped wire tie, sized to extend within 1 inch of masonry face, made from 0.188-inch- diameter, hot-dip galvanized steel wire.

        iii) Accessories: Provide the manufacturers standard seismic resistant assemblies/accessories including a continuous stainless steel wire and high-impact P.V.C. seismic clip assembly designed to work in conjunction with the adjustable anchors and the exterior wall horizontal reinforcing system specified.

C. Partition Top Anchors: 0.097-inch-thick metal plate with 3/8-inch-diameter metal rod 6 inches long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

    1. Where indicated on the Drawings, or as acceptable to the Architect, the partition-top anchors may be fabricated from a pair of continuous rigid steel angles, mechanically secured to the overhead structure; size of angles shall be of the length to resist the overturning of the masonry partition.

2.08 MISCELLANEOUS ANCHORS

A. Anchor Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to

comply with ASTM A 153, Class C; of diameter and length indicated. Provide headed bolts, unless otherwise indicated.

B. Post-Installed Anchors: Chemical anchors with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

1. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

2. For Post-Installed Anchors in Concrete: Capability to sustain, without failure, a load equal to four times the loads imposed.

2.09 FLASHING MATERIALS

A. Metal Flashing: Fabricate from the following metal complying with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim" and below:

B. Concealed Flashing: For through-wall flashing and flashing partly exposed to the exterior, use stainless steel flashing, to include sill/drip pans specified in ñSection 07620 - Flashing and Sheet Metalò.

2.10 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.

B. Preformed Control-Joint Gaskets: Material as indicated below, designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

1. Styrene-Butadiene-Rubber Compound: ASTM D 2000, Designation M2AA-805.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Round Plastic Weep/Vent Tubing: Medium-density polyethylene, 3/8-inch OD by 4 inches long.

1. Selected Product: Provide ñRound Plastic Weep Holesò as manufactured by Hohmann & Barnard, Inc., or equivalent acceptable to the Architect.

E. Cavity Drainage Material: 1- and 2-inch-thick (as indicated), free-draining mesh; made from polyethylene strands and shaped to avoid being clogged by mortar droppings.

1. Selected Product: Provide ñMortar Netò as manufactured by Hohmann & Barnard, Inc., or equivalent acceptable to the Architect.

F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.

2.11 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Selected Product: Provide proprietary acidic cleaner ñCustom Masonry Cleanerò as manufactured by ProSoCo, Inc., or approved equal.

2.12 MORTAR AND GROUT 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 in mortar or grout.

2. Add cold-weather admixture (if used) at the same rate for all mortar, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar and Grout Mix: Furnish dry mortar and grout (including aggregates, cementitious materials, admixtures and other dry ingredients) 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.

1. Selected Product: Provide preblended, dry mortar mix systems (to which only job-site potable water be added) as manufactured by Spec-Mix Inc, a div. of Package Pavement Co., Inc, or approved equal acceptable to the Architect.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification.

1. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.
2. For interior and exterior above-grade walls use Type N, unless otherwise indicated.
3. For interior wythe of exterior cavity walls use Type S, unless otherwise indicated.

D. Grout for Unit Masonry: Comply with ASTM C476.

1. Use grout of type indicated, or if not otherwise indicated of the type (fine and coarse) that will comply with Table 5 of ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour heights.

2. Provide grout with a slump of 8 to 11 as measured according to ASTM C143.

E. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Limit pigments to the following percentages of cement content by weight:

1. For mineral-oxide pigments and portland cement-lime mortar, not more than 10 percent.

F. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates combined with selected cementitious materials.

1. Mix to match Architect's sample.

2.13 CAVITY WALL INSULATION

A. Refer to Section 07210 - Building insulation for insulation materials and products.

1. Adhesive: Type recommended by insulation board manufacturer for application indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance.
2. Verify that foundations are within tolerances specified.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

B. Before installation, examine rough-in and built-in construction to verify actual locations of piping connections.

3.02 INSTALLATION, GENERAL

A. Thickness: Build masonry construction to the full thickness shown. Build single-wythe walls to the actual widths of masonry units, using units of widths indicated.

B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to the opening.

C. Cut masonry units with motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern and to fit adjoining construction. Where possible, use full-size units without cutting. Allow units cut with water-cooled saws to dry before placing, unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

D. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

E. Wetting of Brick: Wet brick before laying if the initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at the time of laying.

3.03 CONSTRUCTION TOLERANCES

A. Comply with tolerances in ACI 530.1/ASCE 6/TMS 602 and the following:

B. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.

C. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, nor 1/2 inch maximum.

D. For conspicuous horizontal lines, such as exposed lintels, sills, parapets, changes

of brick color/type and reveals, do not vary from level by more than 1/4 inch in 20 feet, nor 1/2 inch maximum.

E. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

F. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

3.04 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Patterns for Exposed Masonry: Lay exposed masonry in the bond/brick patterns, corbels, rustication and other configurations indicated on the Drawings; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

C. Stopping and Resuming Work: In each course, rack back one-half-unit length; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly if recommended by the manufacturer, and remove loose masonry units and mortar before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built-in items.

E. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

1. At exterior frames, insert extruded polystyrene board insulation around perimeter of frame in thickness indicated, but not less than 3/4 inch to act as a thermal break between frame and masonry.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

G. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

H. Where indicated on the Drawings, place vertical reinforcing bars in the center of the concrete unit masonry cells and grout full height, unless otherwise indicated.

1. Rod, tamp and otherwise work the grout completely into the masonry cells resulting in complete coverage of steel re-bars and even distribution of grout materials.

3.05 MORTAR BEDDING AND JOINTING

A. Lay hollow concrete masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.

2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.

3. For starting course on footings where cells are not grouted, spread out full

mortar bed, including areas under cells.

4. Maintain joint widths indicated, except for minor variations required to maintain bond alignment. If not indicated, lay walls with 3/8-inch joints.

B. Lay solid brick-size masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Set trim units in full bed of mortar with vertical joints slushed full. Fill dowel, anchor, and similar holes solid. Wet stone-joint surface thoroughly before setting; for soiled stone surfaces, clean bedding and exposed surfaces with fiber brush and soap powder and rinse thoroughly with clear water.

D. Tool exposed joints slightly concave when thumb-print hard, using a jointer larger than the joint thickness, unless otherwise indicated.

3.06 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY

A. Use individual metal ties installed in horizontal joints to bond wythes together. Provide ties as shown, but not less than 1 metal tie for 4 sq. ft. of wall area spaced not to exceed 24 inches o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches of openings and space not more than 36 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches o.c. vertically.

B. Use continuous horizontal-joint reinforcement installed in horizontal mortar joints, spaced 24" on center, for bond tie between wythes, unless otherwise indicated.

C. Use either of the structural bonding systems specified above where acceptable to the Architect.

D. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.

1. Provide continuity with horizontal-joint reinforcement at corners by using prefabricated "L" units in addition to masonry bonding.

E. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:

1. Provide continuity with horizontal-joint reinforcement by using prefabricated "T" units.

3.07 CAVITIES

A. Keep cavities clean of mortar droppings and other materials during construction. Strike joints facing cavities flush.

B. Tie exterior wythe to back-up with continuous (adjustable) horizontal-joint reinforcing fabricated with integral ñeyeò type design.

3.08 MASONRY JOINT REINFORCEMENT

A. General: Provide continuous masonry joint reinforcement as indicated. Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.

1. Space reinforcement not more than 24 inches o.c., unless otherwise indicated.
2. Space reinforcement not more than 8 inches o.c. in parapet walls.
3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings.

    a. Reinforcement installation requirements specified above are in addition to the continuous horizontal reinforcing.

B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

3.09 CAVITY-WALL INSULATION

A. On units of rigid board insulation, place small dabs of adhesive, spaced approximately 12 inches o.c., both ways on inside face or attach to inside face with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

B. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.10 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of

mortar or other rigid materials, unless otherwise indicated.

2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and securely attached to structure.
3. Space anchors as indicated, but not more than 24 inches o.c. vertically and 36 inches o.c. horizontally. Anchor both sides of control and expansion joints.

3.11 CONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joints in unit masonry where indicated. Build-in related items as masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in-plane restraint of wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Fit bond-breaker strips into hollow contour in ends of concrete masonry units on one side of control joint. Fill resultant core with grout and rake joints in exposed faces.
2. Install preformed control-joint gaskets designed to fit standard sash block.
3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar or rake joint.
4. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete.

C. Form expansion joints in brick made from clay or shale as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.
2. Build flanges of factory-fabricated, expansion-joint units into masonry.
3. Build in joint fillers where indicated.
4. Form open joint of width indicated, but not less than 3/8 inch for installation of sealant and backer rod. Keep joint free and clear of mortar.

D. Build in horizontal, pressure-relieving joints where indicated; construct joints by either leaving an air space (interior walls) or inserting a compressible filler (exterior walls) of width required for installing sealant and backer rod.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry veneer and other structural elements, attached to structure behind masonry veneer.

E. Build in two inch building expansion joints as shown on the Drawings. Properly

prepare substrates, apply primers, insert preformed foam expansion joint filler and joint sealant specified in ñSection 07920 - Joint Sealants."

3.12 SETTING GLASS UNIT MASONRY

A. General: Set first and succeeding courses of glass unit masonry with completely filled bed and head mortar joints, with no furrowing.

B. Install glass unit masonry to comply with dimensional tolerances specified with courses accurately spaced and coordinated with other construction; maintain the following joint widths:

1. Joint Widths: 1/4 inch unless otherwise indicated.

C. Install panel reinforcing in horizontal joints at spacing indicated and to run continuously from end to end of panels; comply with the following requirements:

1. Vertical Spacing of Panel Reinforcing: As follows:

a. For exterior panels, every other course starting with first course above sill.

b. For interior panels constructed of 3-7/8-inch-thick units, not more than 24 inches on center, unless otherwise indicated.

2. Place panel reinforcing in joints immediately above and below all openings within glass unit masonry panels.

3. Lap panel reinforcing not less than 6 inches where more than one length is necessary.

4. Embed panel reinforcing in mortar bed by placing lower half of mortar bed first, then pressing panel reinforcing into place and covering with upper half of mortar bed, and then troweling it smooth.

D. Install panel anchors at locations indicated and in same horizontal joints where panel reinforcing occurs. Extend panel anchors at least 12 inches into joints and bend within expansion joints at edges of panels and across the head. Attach panel anchors as follows:

1. For unit masonry, embed other ends of panel anchors, after bending portions crossing joint, in horizontal mortar joints closest in elevation to joints in glass unit masonry containing panel anchors.

2. For steel members, attach panel anchors with 1/4-inch-diameter steel bolts

in tapped holes in steel members.

E. Use rubber mallet to tap units into position. Do not use steel tools, and do not allow units to come into contact with metal accessories and frames.

F. Use wedges in mortar joints of lower courses where needed to prevent mortar from being squeezed out of joints.

G. Rake out mortar from joints in exterior panels to a uniform depth equal to joint width to accommodate pointing material.

H. Fill raked joints and voids with pointing mortar. Apply in layers; fully compact each layer and allow to become thumbprint hard before applying next layer.

I. Pointing of joints in exterior walls with sealant, including installation of joint fillers after final mortar set, is specified in Section 07900 Joint Sealers.

J. Tool exposed joints slightly concave using a jointer larger than joint width; perform tooling while mortar is still plastic and before it takes final set.

K. Remove surplus mortar from face of glass block at time joints are tooled. Remove mortar while it is still plastic using a clean wet sponge or an ordinary household scrub brush with stiff bristles. Do not use harsh cleaners, acids, abrasives, steel wool, or wire brushes when removing mortar or cleaning glass unit masonry.

3.12 STONE INSTALLATION

A. General: Set in full bed of mortar, unless otherwise indicated. Provide setting buttons as required to prevent extrusion of mortar. Grout joints not to exceed 1/4", unless otherwise indicated.

3.13 LINTELS

A. Install steel lintels where indicated. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.14 FLASHING AND ACCESSORIES

A. General: Install concealed flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Unless otherwise indicated, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal

penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.

C. Install flashing as follows:

1. At cavity walls, extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up as indicated on the Drawings; if not indicated, not less than 8 inches, and through the inner wythe to within 1/2 inch of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches, unless otherwise indicated.

2. At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end. At heads and sills, extend flashing 4 inches at ends and turn flashing up not less than 2 inches to form a pan, unless otherwise indicated.

3. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Division 7 Section "Joint Sealants" for application indicated.

4. Where flashing assemblies are penetrated, or otherwise punctured, by anchors and other construction, patch flashing membranes with additional membrane material, adhesives, mastics and other materials recommended by the flashing manufacturer.

5. Cut flashing off flush with face of wall after masonry wall construction is completed.

D. Construct open head holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing and as follows:

1. Use open-head-type weep hole/vents to form weep system.

2. Space assemblies 24 inches o.c.

3. In cavities, place specified high density polyethylene mesh type drainage materials of the thickness recommended by the manufacturer, immediately above top of flashing assemblies embedded in the wall, as masonry construction progresses, to catch and permanently suspend mortar droppings and to maintain positive drainage of the cavity wall.

E. Construct vents in vertical head joints; vents spaced at the top of each continuous

cavity at 24" o.c., unless otherwise indicated. Use open-head type weep hole/vents to form vents, unless otherwise indicated.

F. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

3.15 FIELD QUALITY CONTROL

A. The Owner shall employ and pay a qualified independent testing agency to perform the following testing for field quality control. Retesting of materials failing to meet specified requirements shall be done at Contractor's expense.

B. Testing Frequency: Tests and Evaluations listed in this Article will be performed during construction; perform mortar testing for each type of mortar at the commencement of the Work, at the end of the Work and at the time of Substantial Completion.

C. Mortar properties will be tested per property specification of ASTM C 270.

D. Grout will be sampled and tested for compressive strength per ASTM C 1019.

E. Prism-Test Method: For each type of wall construction indicated, masonry prisms will be tested per ASTM E 447, Method B, and as follows:

1. Prepare 1 set of prisms for testing at 7 days and 1 set for testing at 28 days.

F. Evaluation of Quality-Control Tests: In the absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from construction quality-control tests comply with minimum requirements indicated.

3.16 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes and vents, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application.

C. In-Progress Cleaning: Clean all unit masonry (concealed and exposed) as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel or on a concealed portion of the building as directed by the Architect; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing the surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions; and in accordance with the Brick Institute of Americas recommendations.

END OF SECTION

SECTION 06100
ROUGH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: The Work of this Section includes, but is not limited to, the following:

1. Framing with dimension lumber to include joists and rafters.
2. Wood grounds, nailers, blocking and furring and other miscellaneous carpentry work which is generally concealed by other construction.
3. Plywood backing and construction panels, as indicated.
4. Plywood sheathing.
5. Fastening devices and other installation accessories.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for manufactured materials, including fasteners.

B. Material Certificates: Submit listing of species and grade selected for framing lumber, and a signed copy of grading rules showing design values for selected lumber. Design values shall comply with specified requirements and American Lumber Standards Committee.

1. Certification of Fire Retardant Treatment: Submit certification stating name of fire retardant materials used, and compliance with local building code requirements, and compliance with AWPA Specification C1 and C20 for lumber and C27 for plywood.

C. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for handling, storing, installation and finishing of treated material.

1. Preservative Treatment: For each type specified, include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained and conformance with applicable standards.

a. For water-borne treatment include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to Project site.

1.03 QUALITY ASSURANCE

A. Workmanship: Adequate provisions shall be made for the expansion of woodwork, provide details as indicated, recommended by woodwork standards and as accepted by the Engineer. The substrates supporting finished work shall not promote warping, splits or open joints in finished work.

B. Codes and Standards: Comply with provisions of the following, unless otherwise indicated:

1. Lumber Standards: Comply with PS 20-70 ñAmerican Softwood Lumber Standardò and with applicable rules of the respective grading and inspecting agencies for species and products indicated.
2. Plywood Product Standards: Comply with PSI (ANSI A 199.1), and with applicable American Plywood Association (APA) Performance Standard.
3. National Forest Products Association, NFPA, "National Design Specification and Design Values for Wood Construction".

C. Factory-mark each piece of lumber and plywood with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.

1.04 PRODUCT HANDLING

A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber as well as plywood and other panels; providing for air circulation within and around stacks and under temporary coverings.

1. For lumber and plywood pressure treated with water-borne chemicals, sticker between each course to provide air circulation.

1.05 PROJECT CONDITIONS

A. Coordination: Fit carpentry work to other work accurately; scribe and cope as required for accurate fit. Correlate location of rough carpentry and similar supports to allow proper attachment of other work.

1. Do not apply materials to a damp or wet substrate or in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.01 LUMBER, GENERAL

A. Lumber Standards: Manufacture lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

B. Inspection Agencies: Inspection agencies and the abbreviations used to reference with lumber grades and species include the following:

1. APA - American Plywood Association.
2. NLGA - National Lumber Grades Authority.
3. SPIB - Southern Pine Inspection Bureau.
4. WCLIB - West Coast Lumber Inspection Bureau.
5. WWPA - Western Wood Products Association.

C. Grade Stamps: Factory-mark each piece of lumber with grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species, moisture content at time of surfacing, and mill.

D. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.

1. Provide dressed lumber, S4S, unless otherwise indicated.
2. Provide seasoned lumber with 19 percent maximum moisture content at time of shipment for sizes 2" or less in nominal thickness.

2.02 DIMENSION LUMBER

A. Joists, Rafters, and Dimension Lumber Light Framing (2" thick, 4 wide): Provide any species and grade under WWPA or WCLIB rules which meets the following values:

1. Fb (minimum extreme fiber stress in bending); 1,400 psi, unless otherwise indicated.
2. Fv (minimum horizontal shear force); 90 psi, unless otherwise indicated.
3. E (minimum modulus of elasticity); 1,400,000, unless otherwise indicated.

B. Provide No. 2 grade dimension lumber from any of the following species:

1. Douglas fir-larch; WCLIB or WWPA.
2. Douglas fir-larch (north); NLGA.
3. Hem-fir (north); NLGA.
4. Southern pine; SPIB.

2.03 MISCELLANEOUS LUMBER

A. Provide wood for support or attachment of other work including bucks, nailers, blocking, furring, grounds, and similar members. Provide lumber of sizes required.

B. Moisture Content: 19 percent maximum.

C. Grade: Standard Grade light framing size lumber of any species or board size lumber as required. No. 3 Common or Standard grade boards per WCLIB or WWPA rules.

2.04 WOOD-BASED STRUCTURAL-USE PANELS, GENERAL

A. Structural-Use Panel Standards: Provide either all-veneer, mat-formed, or composite panels complying with DOC PS 2, "Performance Standard for Wood-Based Structural-Use Panels," unless otherwise indicated. Provide plywood panels complying with DOC PS 1, "U.S. Product Standard for Construction and Industrial Plywood," where plywood is indicated.

B. Trademark: Factory mark structural-use panels with APA trademark evidencing compliance with grade requirements.

2.05 CONCEALED, PERFORMANCE-RATED STRUCTURAL-USE PANELS

A. General: Where structural-use panels are indicated for the following concealed types of applications, provide APA-performance-rated panels complying with requirements designated under each application for grade, span rating, exposure durability classification, and edge detail.

B. Thickness: Provide panels meeting requirements specified but not less than thickness indicated.

C. Span Ratings: Provide panels with span ratings required to meet ñCode Plusò provisions of APA Form No. E30, ñAPA Design/Construction Guide: Residential & Commercial.ò

1. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch thick.

2.06 SHEATHING

A. Plywood Roof Sheathing: Exterior, Structural I sheathing.

1. Span Rating: Not less than 16/0, unless otherwise indicated.

2. Thickness: 3/4 inch; unless otherwise indicated

B. Wall Sheathing: APA C-D (with intermediate or exterior glue); APA Structural I C-C or C-D; APA Structural II C-C or C-D; or APA C-C exterior.

2.07 MISCELLANEOUS MATERIALS

A. Fasteners and Anchorages, General: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommended nails.

1. Wood Screws: ANSI B18.6.1.
2. Lag Bolts: ANSI B18.2.1.
3. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and where indicated, flat washers.

B. Corrosion Isolators: Provide polyethylene, nylon or other non-reactive polymer sleeve/tube assemblies, washers and other such isolators designed to completely separate galvanized steel hardware from preservative treated wood/carpentry. Devices shall be of the diameter and to slide over the threaded fastener; and of sufficient length to protect/isolate incompatible materials throughout their entire depth.

1. Provide a matching neoprene, high density polyethylene, nylon or other non-reactive polymer washer material between galvanized steel washers and treated lumber; provide materials with sufficient density to resist crushing forces during installation.

2.08 WOOD TREATMENT BY PRESSURE PROCESS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and one of the following:

a. Ammoniacal copper zinc arsenate (ACZA).
b. Ammoniacal, or amine, copper quat (ACQ).

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

1. Application: Treat items indicated on Drawings, and the following:

a. Wood cants, nailers, curbs, blocking, stripping, sleepers and similar members in connection with roofing and within the exterior walls.
b. Wood, blocking furring, stripping and similar concealed members in contact with masonry.

C. Fire-Retardant-Treated Materials: Where fire-retardant-treated materials are indicated, provide materials that comply with performance requirements in AWPA C20 (lumber) and AWPA C27 (plywood). Identify fire-retardant-treated wood with appropriate classification marking of UL, U.S. Testing, Timber Products Inspection, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1 Use treatment for which chemical manufacturer publishes physical properties of treated wood after exposure to elevated temperatures, when tested by a qualified independent testing agency according to ASTM D 5664, for lumber and ASTM D 5516, for plywood.
3. Use treatment that does not promote corrosion of metal fasteners.
4. Types:

a. Use Exterior type for exterior locations and where indicated.
b. Use Interior Type A, High Temperature (HT) for enclosed roof framing, framing in attic spaces, and where indicated.

4. Products: Subject to compliance with requirements, provide one of the following:

a. "Dricon," Hickson Corporation.
b. "Pyro-Guard," Hoover Treated Wood Products

D. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment and to comply with AWPA M4. Inspect each piece of lumber after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

A. Discard units of material with defects which might impair quality of work, and

units which are too small for minimum joints.

B. Set carpentry work to required levels and lines, with members plumb and true and cut and fitted.

C. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards.

3.02 WOOD GROUNDS, NAILERS, AND BLOCKING

A. Attachment of blocking and frequency of attachment of nailers to roof construction shall comply with requirements of Factory Mutual (FM) Loss Prevention Data Sheet 1-49, ñTable 2 Maximum Recommended ñLò & ñXò Dimensions and Metal Thickness for Roof Edge Flashingsò for velocity pressures required for the design of this project.

B. Provide where required for attachment of other work. Form and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

C. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces. Build into masonry during installation of masonry work.

D. Frame miscellaneous concealed lumber blocking and supports for items of equipment that are attached to the framing system as indicated on the Drawings.

3.03 DIMENSION LUMBER FRAMING INSTALLATION

A. Joists: Install joists with crown edge up and support ends of each member with not less than 1-1/2 inches of bearing on wood or metal, or 3 inches on masonry. Face nail to ends of parallel rafters, unless otherwise indicated on approved shop drawings.

1. Where joists are at right angles to rafters or other structural framing/supports, provide additional short joists parallel to supports from wall plate to first joist; nail to ends of rafters and to top plate and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8 inch nominal size or 2-by-4 inch nominal size units spaced 48 inches o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and toe nail or use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

3.04 INSTALLATION OF CONSTRUCTION PANELS

A. General: Comply with applicable recommendations contained in Form No. E 30F, "APA

Design/Construction Guide - Residential & Commercial", for types of construction panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Plywood Construction Panels: Screw or nail to supports.
2. Roof Sheathing: Nail or screw to supports.
3. Wall Sheathing: Nail or screw to supports.

END OF SECTION

SECTION 07210
BUILDING INSULATION

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: This Section includes the following:

1. Rigid board-type building insulations.
2. Faced blanket/batt-type building insulations.
3. Tapes, fasteners, and other insulation accessories.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's product data and installation instructions for each type of insulation and vapor retarder material required.

B. Certified Test Reports: With product data, submit certified test reports showing compliance with specified performance values, including thermal resistance values, densities, fire performance, perm ratings, water absorption ratings and similar properties.

1.03 QUALITY ASSURANCE

A. Single-Source Responsibility for Insulation Products: Obtain each type of building insulation from a single source with resources to provide products complying with requirements indicated without delaying the Work.

B. Fire Performance Characteristics: Provide insulation materials which are identical to those whose fire performance characteristics, as listed for each material or assembly of which insulation is a part, have been determined by testing, by UL or other testing and inspection agency acceptable to authorities having jurisdiction.

1. Surface Burning Characteristics: ASTM E 84.
2. Fire Resistance Ratings: ASTM E 119.
3. Combustion Characteristics: ASTM E 136.

C. Thermal Resistivity: Designated thermal resistance values represent the rate of heat flow through a homogenous material exactly 1" thick. They are expressed by the temperature difference in degrees F between the two exposed faces required to cause one BTU to flow through one square foot per hour at mean temperatures indicated.

1.04 DELIVERY, STORAGE, AND HANDLING

A. General Protection: Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection.

B. Plastic Insulation: Minimize exposure to sunlight. Protect against ignition at all times. Do not deliver plastic insulation ahead of installation time. Complete installation as rapidly as possible.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, provide insulation products and accessories as manufactured by one of the following, or equal acceptable to the Architect:

1. Extruded-Polystyrene Board Insulation:

    a. DiversiFoam Products.
    b. Dow Chemical Co.
    c. Owens-Corning Co.

2. Glass-Fiber Insulation:

    a. CertainTeed Corporation.
    b. Knauf Fiber Glass.
    c. Owens-Corning Co.

2.02 INSULATING MATERIALS

A. General: Provide insulating materials which comply with requirements indicated for materials, compliance with referenced standards, and other characteristics. Provide insulation of thickness shown.

1. Preformed Units: Sizes to fit applications indicated, selected from manufacturer's standard thicknesses, widths and lengths.

B. Rigid Foam Insulation: Rigid, cellular polystyrene thermal insulation formed from polystyrene base resin by an extrusion process using hydrochlorofluorocarbons as blowing agent to comply with ASTM C 578; with maximum flame-spread and smoke-developed indices of 75 and 450, respectively, for type and density indicated below:

1. Type IV, 1.60 lb/cu. ft.; 2ò thickness, or as required to meet performance criteria of insulation for R-value of 10.

C. Glass Fiber Blanket/Batt Insulation: Thermal insulation produced by combining glass fibers with thermosetting resins to comply with ASTM C 665 for Type III, Class A and as follows:

1. Combustion Characteristics: Faced blanket/batt passes ASTM E 136 test, unless otherwise indicated.
2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.
3. Thickness: As required to meet the minimum thermal performances indicated, or provide an R-value of 13.

2.03 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Type recommended by insulation manufacturer, and complying with requirements for fire performance.

PART 3 - EXECUTION

3.01 INSPECTION AND PREPARATION

A. Examine substrates and conditions under which insulation work is to be performed. Submit a report listing conditions detrimental to performance of work in this section. Do not proceed with installation of insulation until unsatisfactory conditions have been corrected.

B. Clean substrates of substances harmful to insulations.

C. Commencement of the building insulation work implies the Contractors acceptance of the underlying conditions and substrate construction to which the building materials are installed.

3.02 INSTALLATION, GENERAL

A. Comply with manufacturer's instructions. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

C. Seal joints between closed-cell insulation units by applying adhesive, mastic, or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with adhesive, mastic, or sealant as recommended by insulation manufacturer.

D. If no specific method is indicated, bond units with adhesive or use mechanical anchorage to provide permanent placement and support.

3.03 GENERAL BUILDING INSULATION

A. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness. Where multiple layers of insulation are to be installed with edges of underlying layers off-set and staggered in accordance with the manufacturerôs recommendations.

B. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces.

1. Tape joints and ruptures in vapor retarder faced units, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

C. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:

1. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.

D. Cavity Wall Insulation: Install pads of adhesive spaced approximately 24 inches 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 indicated.

1. Provide additional insulation anchors to supplement adhesively attached board insulation; in accordance with the manufacturer's written instructions.

E. Installation of Perimeter Insulation:

1. On vertical surfaces, set units in adhesive applied according to manufacturer's written instructions. Use adhesive recommended by insulation manufacturer.
2. On horizontal surfaces, loosely lay insulation units according to manufacturer's written instructions. Stagger end joints and tightly abut insulation units.

3.04 PROTECTION

A. General: Protect installed insulation from harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 07920
JOINT SEALANTS

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: The Work of this Section includes, but is not limited to, the following:

1. Interior and exterior joint sealants and backings in horizontal and vertical surfaces, as indicated and required.
2. Primers, bond breakers, backer rods, sound seals and other accessory materials for interior and exterior joints.

1.02 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

B. Sealants used as weather seals shall not experience adhesive or cohesive failure. Sealants shall withstand movements up to the limits prescribed by the manufacturer. Exposed sealant surface shall not crack or bubble. Sealants and primers shall not stain adjacent materials. Sealants shall not be adhered to, or placed against, the edge of a laminated glass unit interlayer.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each product required, including instructions for preparation and application.

B. Samples:

1. Submit samples for initial selection purposes in form of manufacturer's standard bead samples, consisting of strips of actual products showing full range of manufacturerôs standard colors available, for each product exposed to view.
2. Submit samples for verification purposes of each type and color of joint sealant required. Install joint sealant samples in 1/2-inch wide joints formed between two 6-inch long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

C. Certificates: Submit certificates from manufacturers that their products comply with specifications and are suitable for the use indicated.

D. Test Reports: Submit joint sealer-substrate test results to verify compatibility of proposed joint sealants with substrates. Manufacturer shall conduct tests and provide reports complying with the following:

1. Compatibility and adhesion test reports from elastomeric sealant manufacturer indicating that materials forming joint substrates and joint sealant backings have been tested for compatibility and adhesion with joint sealants. Include sealant manufacturer's interpretation of test results relative to sealant performance and recommendations for primers and substrate preparation needed to obtain adhesion.
2. Preconstruction field test reports indicating which products and joint preparation methods demonstrate acceptable adhesion to joint substrates.

1.04 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

B. Testing Laboratory Qualifications: To qualify for acceptance, an independent testing laboratory must demonstrate to Architect's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct satisfactorily the testing indicated without delaying progress of the Work.

C. Single Source Responsibility for Joint Sealant Materials: Obtain each different primary joint sealant materials required from a single manufacturer; obtain auxiliary/secondary materials as recommended by, and acceptable to, the prime materials manufacturer.

D. Preconstruction Field Testing: Prior to installation of joint sealants, field-test their adhesion to joint substrates as follows:

1. Locate test joints where indicated or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:

    a. Each type of elastomeric sealant and joint substrate indicated.

3. Notify Architect one week in advance of the dates and times when mock-ups will be erected.
4. Arrange for tests to take place with joint sealant manufacturer's technical representative present.
5. Test Method: Test joint sealants by hand pull method described below:

a. Install joint sealants in 60 inches joint lengths using same materials and methods for joint preparation and joint sealant installation required for completed Work. Allow sealants to cure fully before testing.
b. Make knife cuts horizontally from one side of joint to the other followed by 2 vertical cuts approximately 2 inches long at side of joint and meeting horizontal cut at top of 2-inch cuts. Place a mark 1 inch from top of 2-inch piece.
c. Use fingers to grasp 2" piece of sealant just above 1-inch mark; pull firmly down at a 90-degree angle or more while holding a ruler along side of sealant. Pull sealant out of joint to the distance recommended by sealant manufacturer for testing adhesive capability, but not less than that equaling specified maximum movement capability in extension; hold this position for 10 seconds.

6. Report whether or not sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate.
7. Evaluation of Field Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

E. Stainability Tests: Prior to installation of joint sealants, field-test sample applications of sealant on stone and other porous substrate samples of types of substrates to be used in the Project to test stainability of substrates by sealants proposed to be use in the finished work. Submit test samples for evaluation.

F. Field-Constructed Mock-Ups: Prior to installation of joint sealants, apply elastomeric sealants as follows to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution:

1. Joints in field-constructed mock-ups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants specified in this Section.

G. Pre-Installation Conference: Before beginning the sealant installation, conduct a preinstallation conference at a location determined by the Architect with the sealant manufacturer(s), installer, aluminum system manufacturer's representative, precast panel manufacturer and other interested parties to review procedures, schedules, and coordination of the sealant with other elements of the Work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.06 PROJECT CONDITIONS

A. Environmental Conditions: Do not install joint sealers when air and surface temperatures are outside the limits permitted by joint sealer manufacturer, or when joint substrates are wet or dirty.

B. Joint Widths: Do not proceed with installation of joint sealers when joint widths are not as allowed by joint sealer manufacturer.

1.07 WARRANTY

A. Submit a written warranty agreeing to repair or replace defective joint sealer materials or workmanship; including staining, loss of adhesion, loss of cohesion, cracking or discoloration, for a period of 5 years from the date of Substantial Completion.

B. The warranty should include a provision that the period of such warranty shall commence with the Owners final acceptance of all work covered under the Contract or at such other date or dates as the Owner may specify in writing prior to that time.

C. The following types of failure will be adjudged as defective work:

1. Abnormal deterioration, aging or weathering of the work.
2. Water leakage under conditions equivalent to, or less severe than, those specified.
3. Air leakage exceeding specified limits.
4. Sealant loss of adhesion, loss of cohesion, cracking or discoloration.
5. Staining of sealed substrates by sealant or primer.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering joint sealant products that may be incorporated in the work include, the following:

1. Bostik Construction Product Div.
2. Dow Corning Corp.
3. General Electric Co.
4. Pecora Corporation.
5. Tremco Inc.
6. W.R. Meadows Inc.

2.02 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. Colors: Provide colors of joint sealers as selected by the Architect, from manufacturer's standard colors.

2.03 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing elastomeric sealants that comply with ASTM C 920 and other requirements indicated including those requirements referencing classifications of ASTM C 920 for Type, Grade, Class, and Uses.

B. One-Part Non-Acid-Curing Silicone Sealant: Type S; Grade NS; Class 50; Medium modulus and complying with the following requirements:

1. Uses: For all joints except as otherwise indicated.

2. Additional Capability: When tested per ASTM C 719, to withstand 50 percent increase and decrease of joint width.

3. Products: Subject to compliance with requirements, provide one of the following one-part non-acid-curing silicone sealants:

a. "Dow Corning 791/795"; Dow Corning Corp.
b. "Silpruf"; General Electric Co.
c. "Pecora 865/895"; Pecora Corporation.

C. Two-Part Nonsag Urethane Sealant: Type M; Grade NS; Class 25.

1. Additional Capability: When tested per ASTM C 719, to withstand 50

percent increase and decrease of joint width as measured at time of application.

2. Use: At all exterior vertical joints between masonry, windows, storefronts and curtainwalls, unless otherwise indicated.
3. Products: Subject to compliance with requirements, provide one of the following:

    a. "Dymeric 511"; Tremco, Inc.
    b. "Dynatrol II"; Pecora Corporation.
    c. "DUALTHANE"; W.R. Meadows Inc.

2.04 LATEX JOINT SEALANTS

A. Acrylic-Emulsion Sealant: One part, nonsag sealant complying with ASTM C 834, paintable and recommended for interior applications with joint movement of not more than plus or minus 5 percent.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. "Chem-Calk 600"; Bostik Construction Products Div.
    b. "AC-20"; Pecora Corp.
    c. "Tremco Acrylic Latex 834"; Tremco Inc.

2.05 MISCELLANEOUS JOINT SEALANTS

A. Fire-resistant Joint Sealants, General: Provide sealant with fire-resistance rating identical to assemblies tested per ASTM E 814 by Underwriters Laboratory, Inc. or other testing agency acceptable to authorities.

1. Fire-Stopping Sealant: One or two-part, foamed-in-place, silicone sealant for filling or sealing openings around cables, conduit, pipes and similar penetrations through walls and floors.

    a. Refer to ñSection 07841 - Through-Penetration Firestop Systemsò, for materials and requirements.

B. Butyl-Polyisobutylene Sealant: Manufacturer's standard, solvent- release-curing, butyl-polyisobutylene sealant complying with AAMA 809.2, for concealed metal to metal joints.

C. Acoustical Joint Sealants, General: Provide sealants that comply with the requirements specified herein and as specified in ñSection 09260 - Gypsum Board Assembliesò.

1. Concealed Acoustical Sealant: ASTM C 834, nonhardening, non-skinning, nonstaining, non-bleeding, gunnable sealant for concealed

applications per ASTM C 919.

2. Exposed Acoustical Sealant: Nonoxidizing, skinnable, paintable, gunnable sealant for exposed applications per ASTM C 919.

2.06 COMPRESSION SEALS AND JOINT FILLERS

A. Preformed Foam Sealant: Precompressed, open-cell foam sealant of high-density urethane foam with a nondrying, water repellant agent; precompressed to develop a watertight and airtight seal.

1. Properties: Permanently elastic, mildew-resistant, non-migratory, nonstaining, compatible with joint substrates and other sealers.
2. Products: Subject to compliance with requirements, provide one of the following, of size to suit joint dimensions:

a. "Emseal Greyflex"; Emseal Corp.
b. "Will-Seal Tape Type 150"; Illbruck.

B. Joint Filler for Paving: Preformed strips of sponge rubber complying with ASTM D 1752, of size and shapes as shown.

C. Back-Bedding Mastic Tape Sealant: Preformed, butyl-based elastomeric tape sealant with a solids content of 100 percent; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape manufacturers for application indicated; packaged on rolls with a release paper backing; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for applications in which tape is subject to continuous pressure.
2. AAMA 807.3 tape, for applications in which tape is not subject to continuous pressure.

2.07 JOINT SEALANT BACKING

A. General: Provide backings which are non-staining; are compatible with joint substrates, sealants, primers and other joint fillers; and are approved for applications indicated by sealant manufacturer.

B. Plastic Foam Joint-Fillers: Preformed, compressible, resilient, non-waxing, non-extruding strips of plastic foam of material indicated below, and of size, shape and density to control sealant depth.

1. Flexible, non-gassing, closed-cell polyethylene foam, unless otherwise indicated.

a. Provide color as selected by the Architect from the manufacturerôs full range of colors.

C. Tubing Joint-Fillers: Neoprene, EPDM or silicone tubing complying with ASTM D 1056, non-absorbent to water and gas, resilient at temperatures down to -26 deg F., of size and shape to provide a secondary seal.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape to prevent bond between sealant and materials at back of joint. Provide self-adhesive tape where applicable.

2.08 MISCELLANEOUS MATERIALS

A. Primer: Provide type recommended by joint sealer manufacturer where required for adhesion of sealant to joint substrates, as determined from preconstruction joint sealer-substrate and field tests.

B. Cleaners: Provide non-staining cleaner of type acceptable to manufacturer of sealant and sealant backing materials.

C. Masking Tape: Provide non-staining, non-absorbent type compatible with joint sealants and to surfaces adjacent to joints.

D. Accessory Materials for Fire-Stopping Sealants: Provide accessory materials required for installation of fire-stopping sealants, refer to ñSection 07840 - Through-Penetration Firestop Systemsò.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with

adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean concrete, masonry, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air.
3. Remove laitance and form release agents from concrete.
4. Clean metal, glass, and other nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.
5. Joint Priming: Prime all joint substrates whether or not indicated or recommended by joint sealant manufacturer. Apply primer to comply with joint sealant manufacturer's recommendations.
6. Confine primers to areas of joint sealant bond; do not allow spillage or migration onto adjoining surfaces.

B. Masking Tape: Use masking tape where required to prevent contact of primers, cleaners and joint sealants with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears.

1. Remove tape immediately after tooling without disturbing joint seal.

3.03 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicated, except where more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Installation of Sealant Backings: Install sealant backings to comply with the following requirements:

1. Install joint fillers of type indicated 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.
2. Do not leave gaps between ends of joint fillers.
3. Do not stretch, twist, puncture, or tear joint fillers.

4. Remove absorbent joint fillers that have become wet prior to sealant application and replace with dry material.

D. Install bond breaker tape behind joint sealants where backings are not to be used between sealants and back of joints.

E. Installation of Sealants: 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 widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

F. Tooling of Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide joint configuration as indicated on the drawings, and complying with ASTM C 1193.

    a. Concave Joints: As per the referenced standard; Figure 5A, where indicated.
    b. Recessed Joints: As per the referenced standard; Figure 5C, with recess depth of 1/4" from face material; and at locations indicated. Use masking tape to protect adjacent surfaces of recessed tooled joints.
    c. Flush Joints: As per the referenced standard; Figure 5B, where indicated.

G. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, and to comply with sealant manufacturer's directions for installation methods, materials, and tools that produce seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in conformance with sealant manufacturer's recommendations.

H. Installation of Fire-Stopping Sealant: Install sealant and accessory materials to fill openings penetrating floors and walls to provide fire-stops with required fire resistance ratings. Refer to ñSection 07840 - Through-Penetration Firestop Systemsò for additional requirements.

I. Installation of Acoustic Sealant: Install sealant and accessory materials to fill openings penetrating floors and walls to provide air-stops with required acoustic ratings.

1. Acoustical sealant shall be applied in continuous beads. The material shall be resilient and non-setting.
2. Seal sound-rated partitions on both sides where facings abut dissimilar materials. Fill void with 1/4" minimum to 3/8" maximum round bead of sealant, as required.
3. Seal at the following locations:

a. Around the perimeter, in the angle formed by panels and abutting dissimilar materials.
b. At all intersections, and all penetrations of floor, ceiling, walls, columns.
c. At all panel terminations in door and window frames, and at control joint to panels.
d. Around all cutouts for lights, cabinets, pipes and plumbing, HVAC ducts, electrical boxes, etc.

3.04 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealants 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 joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

END OF SECTION

SECTION 081 00
GLASS GLAZING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Tempered Glass.

B. Related Sections
1. Drawings, General and Supplementary Conditions of the Contract, Division 1 and the following Specification Sections, apply to this Section.
2. Section 08410 ï Entrances and Storefronts
3. Section 08420 ï Entrances
4. Section 08430 ï Storefronts

1.02 REFERENCES

A. United States
1. ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
2. ASTM C162 - Standard Terminology of Glass and Glass Products.
3. ASTM C1036 - Standard Specification for Flat Glass.
4. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass -- Kind HS, Kind FT Coated and Uncoated Glass.
5. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Glass.
6. ASTM C1464 - Standard Specification for Bent Glass.
7. ASTM E1300 - Standard Practice for Determining the Minimum Thickness and Type of Glass Required to Resist a Specified Load.
8. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing Materials.

1.03 DEFINITIONS

A. Bentemp® ï Bent tempered glass.

B. Outside Arc Length - Girth measured on outside face of glass.

C. Inside Arc Length ï Girth measured on inside face of glass.

D. Degree of Bend ï Calculated angle of circumference.

E. Chord ï Distance between opposite edges of bent glass.

F. Depth of Bend ï Dimension from chord to surface of glass at highest point of bend.

G. Inside Radius ï Dimension at which glass is bent along the concave surface.

H. Outside Radius ï Dimension at which glass is bent along the convex surface.

I. Centerline Arc Length ï Girth measured at the center of the glass.

J. Angle of Rise ï Calculated measurement of the degree of slope.

K. Offset Dimension ï Calculated dimension of the height of slope.

L. Performance Characteristics
   1. Center-of-Glass ï Performance values that take only the center portion of a glass makeup into account and not the framing members. Customarily found in Sweets catalogs in 08800 architectural specifications.
   2. Glass thermal and optical performance properties shall be based on data and calculations from the current LBNL WINDOW 5.2 computer program.
   3. Fenestration Performance ï Performance values that take into account the total fenestration (center-of-glass and framing members). Normally identified with building energy codes such as ASHRAE-IESNA 90.1 and the IECC. These values can also be tested and certified by the National Fenestration Rating Council (NFRC).

1.04 SYSTEM DESCRIPTION

A. Design Requirements
   1. Provide glazing systems capable of withstanding normal thermal movements, windloads and impact loads, without failure, including loss due to defective manufacture, fabrication and installation; deterioration of glazing materials; and other defects in construction.
   2. Provide glass products in the thicknesses and strengths (annealed or heat-treated) required to meet or exceed the following criteria based on project loads and in-service conditions per ASTM E1300.
      a. Minimum thickness of annealed or heat-treated glass products is selected, so the worst-case probability of failure does not exceed the following:
         1) 8 breaks per 1000 for glass installed vertically or not over 15 degrees from the vertical plane and under wind action.
         2) 1 break per 1000 for glass installed 15 degrees or more from the vertical plane and under action of wind and/or snow.

1.05 SUBMITTALS

A. Submit 12-inch (305mm) square samples of each type of glass indicated (except clear monolithic glass products), and 12-inch (305mm) long samples of each color required (except black) for each type of sealant or gasket exposed to view.

B. Submit manufacturerôs product data sheet and glazing instructions.

C. Glazing contractor shall obtain compatibility and adhesion test reports from sealant manufacturer, indicating that glazing materials were tested for compatibility and adhesion with glazing sealant, as well as other glazing materials including insulating units.

D. Glazing Contractor shall provide test reports showing that the glass meets the requirements of any security test reports specified on drawings.

1.06 QUALITY ASSURANCE

A. Comply with published recommendations of glass product manufacturers and organizations below, except where more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this section or referenced standards.
   1. GANA Publications
   2. AAMA Publications

B. Safety glass products in the US are to comply with CPSC 16 CFR Part 1201 for Category II materials.

C. Single-source fabrication responsibility: All glass fabricated for each type shall be processed and supplied by a single fabricator.

1.07 DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturerôs instruction for receiving, handling, storing and protecting glass & glazing materials.

B. Delivery: Deliver materials in manufacturerôs original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

D. Exercise exceptional care to prevent edge damage to glass, and damage/deterioration to coating on glass.

E. Where insulating glass units will be exposed to substantial altitude changes, comply with insulating glass fabricatorôs recommendations of venting and sealing.

1.08 PROJECT / SITE CONDITIONS

A. Environmental Requirements: Installation of glass products at ambient air temperature below 40 degrees F (4.4 degrees C) is prohibited.

B. Field Measurements: When construction schedule permits, verify field measurements with drawing dimensions prior to fabrication of glass products.

1.09 WARRANTY

A. Provide a written warranty from date of manufacture for tempered glass.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer is used in this section to refer to a firm that produces primary glass or fabricated glass as defined in the referenced standards.
   1. Oldcastle Glass
   2. Guardian Industries
   3. Pilkington
   4. PPG Industries
   5. Visteon Float Glass

2.02 MATERIALS

A. Bentemp® Glass
   1. Glass Type:
   2. Glass Tint:
   3. Nominal Thickness:
   4. Glass Strength: *(Heat-Strengthened or Tempered)*
   5. Coating Orientation: *(N/A, Surface #1 or 2)*
   6. Heat-Strengthened float glass shall comply with ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted, heat-absorbing and light reducing), Class 3 (tinted, light-reducing), Quality Q3, Kind HS.
   7. Tempered float glass shall comply with ASTM C1048, Type I, Class 1 (clear), Class 2 (tinted, heat-absorbing and light reducing), Class 3 (tinted, light-reducing), Quality Q3, Kind FT.
   8. Bent glass shall comply with ASTM C1464 and with other requirements as specified.

B. Glazing Products
   1. Select appropriate glazing sealants, tapes, gaskets and other glazing materials of proven compatibility with other materials that they contact. These include glass products, insulating glass unit seals and glazing channel substrates under installation and service conditions, as demonstrated by testing and field experience.

PART 3 EXECUTION

3.01 EXAMINATION

A. Site Verification and Conditions
   1. Verify that site conditions are acceptable for installation of the glass.
   2. Verify openings for glazing are correctly sized and within tolerance.
   3. Verify that the minimum required face and edge clearances are being followed.
   4. Do not proceed with glazing until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protection
   1. Handle and store product according to manufacturersô recommendations.

B. Surface Preparation

1. Clean and prepare glazing channels and other framing members to receive glass.
2. Remove coatings and other harmful materials that will prevent glass and glazing installation required to comply with performance criteria specified.

3.03 INSTALLATION

A. Install products using the recommendations of manufacturers of glass, sealants, gaskets and other glazing materials, except where more stringent requirements are indicated, including those in the ñGANA Glazing Manualò.

B. Install glass in prepared glazing channels and other framing members.

C. Install setting blocks in rabbets as recommended by referenced glazing standards in GANA Glazing Manual and IGMA Glazing Guidelines.

D. Provide bite on glass, minimum edge and face clearances and glazing material tolerances recommended by GANA Glazing Manual.

E. Set glass lites in each series with uniform pattern, draw, bow and similar characteristics.

F. Distribute the weight of the glass unit along the edge rather than at the corner.

G. Comply with manufacturerôs and referenced industry recommendations on expansion joints 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.

H. Protect glass from edge damage during handling and installation.

I. Prevent glass from contact with contaminating substances that result from construction operations, such as weld spatter, fireproofing or plaster.

J. Remove and replace glass that is broken, chipped, cracked or damaged in any way.

3.04 CLEANING

A. Clean excess sealant or compound from glass and framing members immediately after application, using solvents or cleaners recommended by manufacturers.

B. Glass to be cleaned according to:
1. GANA Glass Informational Bulletin GANA 01-0300 - Proper Procedures for Cleaning Architectural Glass Products.
2. GANA Glass Information Bulletin GANA TD-02-0402 ï Heat-Treated Glass Surfaces Are Different.

C. Do not use scrapers or other metal tools to clean glass.

END OF SECTION

SECTION 08110
STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: The Work of this Section includes, but is not limited to, the following:

1. Non-rated and fire-resistance rated flush design hollow construction type steel doors, as indicated.
2. Fully welded, steel door frames, as indicated.
3. Dutch-type, solid steel doors, as indicated.
4. Glazed openings and other accessories, as indicated.

1.02 SUBMITTALS

A. Product Data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.

B. Shop Drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.

1. Provide schedule of doors and frames.

2. Coordinate glazing frames and stops with glass and glazing requirements.

C. Label Construction Certification: For door assemblies required to be fire-rated and exceeding limitations of labeled assemblies, submit manufacturer's certification that each door and frame assembly has been constructed to conform to design, materials and construction equivalent to requirements for labeled construction.

1.03 QUALITY ASSURANCE

A. Provide doors and frames complying with ANSI/SDI 100 ñRecommended Specifications for Standard Steel Doors and Framesò and as specified.

B. Acoustical Testing Agency Qualifications: An independent testing agency that is an acoustical laboratory accredited by the National Voluntary

Laboratory Accreditation Program of NIST.

C. Source Limitations: Obtain sound control doors and frames, including gasketing, thresholds, hinges (when integral with design), and other appurtenances essential for sound control, from a single manufacturer specializing in producing this type of work, unless otherwise approved by Architect.

D. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per ASTM E 152, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.

1. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F maximum in 30 minutes of fire exposure.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.

B. Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.

C. Store doors and frames at building site under cover. Place units on minimum 4-inch-high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements provide steel doors and frames as manufactured by the following, or approved equal:

1. Standard Hollow Metal Doors:

a. Curries Company.
b. Republic Builders Products.
c. Pioneer Industries.

d. Steelcraft Manufacturing Co. (specified)

2. Dutch-type Steel Doors:

a. Barnware, div. of Industrial Metal Products of Aberdeen, Inc. (specified)

2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.

C. Supports and Anchors: Fabricated from not less than 0.0478-inch-thick steel sheet; 0.0516-inch-thick galvanized steel where used with galvanized steel frames.

D. Inserts, Bolts, and Fasteners: Manufacturerôs standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.

E. Glass: Refer to ñSection 08800 - Glass and Glazingò for glazing materials and performance requirements.

F. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics

2.03 STANDARD STEEL DOORS

A. Steel Doors: Provide 1-3/4-inch-thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:

1. Interior Doors: Level 4 (14 gauge) and Physical Performance Level A (Maximum Duty), Model 2 (Seamless).
2. Exterior Doors and Interior Wet Area Doors: Level 4 (14 gauge) and Physical Performance Level A (Maximum Duty), Model 2 (Seamless).

2.04 FRAMES

A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, according to ANSI/SDI 100, and of types and styles as shown on Drawings and schedules. Conceal fastenings, unless otherwise indicated. Fabricate frames of minimum 0.0478-inch-thick cold-rolled steel sheet.

1. Fabricate frames with mitered or coped and continuously welded corners.
2. Fabricate frames for interior openings from 0. 067-inch-thick steel sheet.
3. Fabricate exterior frames for openings from 0.067-inch-thick galvanized steel sheet.
4. Provide frames as recommended by Steelcraft Manufacturing Co. for specialty function doors and as indicated or required by door type, construction and use.

B. Sound Seals: Door manufacturerôs gasketing system to provide sound rating indicated for sound rated doors. Provide compression or magnetic, one-piece head and jamb seals. Provide automatic door bottoms or compression seals with cam-lift hinges at sill with smooth threshold recommended by manufacturer.

C. Door Silencers: Except on weatherstripped and sound rated frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.

D. Plaster Guards: Provide minimum 0.0179-inch-thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

E. Grout: Comply with ASTM C 476, with a slump of 4 inches for standard steel door frames built into concrete or masonry, as measured according to ASTM C 143. Refer to additional requirements as specified in ñSection 04810 - Unit Masonry Assembliesò.

1. Coal tar frames where they abut masonry substrates, in accordance with material manufacturers written instructions and directions.

2.05 FABRICATION

A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturerôs plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.

1. Internal Construction: One of the following manufacturerôs standard core materials according to SDI standards:

    a. Resin-impregnated paper honeycomb, unless otherwise indicated.
    b. Rigid mineral fiber with internal sound deadener on inside of face sheets (at acoustically rated doors).

2. Clearances: Not more than 1/8 inch at jambs and heads, except not more than 1/4 inch between non-fire-rated pairs of doors. Not more than 3/4 inch at bottom.

    a. Fire Doors: Provide clearances according to NFPA 80.

B. Fabricate exposed faces of doors and panels, including stiles and rails of nonflush units, from only cold-rolled steel sheet.

C. Tolerances: Comply with SDI 117 ñManufacturing Tolerances Standard Steel Doors and Frames.ò

D. Fabricate concealed stiffeners, reinforcement, edge channels, louvers, and moldings from either cold- or hot-rolled steel sheet.

E. Galvannealed Steel Doors and Frames: For the following locations, fabricate doors and frames from galvanized steel sheet according to SDI 112. Close top and bottom edges of doors flush as an integral part of door construction or by addition of minimum 0.0635-inch-thick galvanized steel channels, with channel webs placed even with top and bottom edges. Seal joints in top edges of doors against water penetration.

    1. At exterior locations and where indicated.

F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

G. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.

    1. Unless otherwise indicated, provide thermal-rated assemblies with U-value rating of 0.41 Btu/sq. ft. x h x deg F or better.

H. Sound-Rated (Acoustical) Assemblies: Where shown or scheduled, provide door and frame assemblies fabricated as sound-reducing type, tested according to ASTM E 1408, and classified according to ASTM E 413.

1. Provide acoustical assemblies with STC sound ratings of 50 or better, as scheduled.

I. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.

1. Hardware for sound rated doors shall be factory installed by the manufacturer of the door.

2. For concealed overhead door closers, provide space, cutouts, reinforcing, and provisions for fastening in top rail of doors or head of frames, as applicable.

3. Refer to ñSection 08710 - Door Hardwareò for materials and configurations hardware devices required for each steel door and frame assembly specified. Prepare frames for electrified hardware and conduits and wiring as required.

J. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.

1. Provide additional reinforcing indicated on the drawings or as required at connections between hardware closers and door assembly.

K. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Instituteôs (DHI) ñRecommended Locations for Architectural Hardware for Standard Steel Doors and Frames.ò

L. Glazing Stops: Minimum 0.0359-inch-thick steel or 0.040-inch-thick aluminum.

1. Provide nonremovable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.

2. Provide screw-applied, removable, glazing beads on inside of glass, louvers, and other panels in doors.

3. Provide stops on doors as indicated, except at specialty function Bedroom doors. Refer to the Drawings and Door Schedule for specific door types and locations.

2.06 FINISHES, GENERAL

A. Steel doors shall be finished at the factory.

B. Comply with NAAMMôs ñMetal Finishes Manualò for recommendations relative to applying and designating finishes.

C. Comply with SSPC-PA 1, ñPaint Application Specification No. 1,ò for steel sheet finishes.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturerôs data, and as specified.

B. Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.

1. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
2. At concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.

    a. Grouting of Frames: Fill space between frames with grout as recommended by the steel door manufacturer. Install grout in accordance with the grout manufacturers and steel door manufacturers written instructions. Brace frames to ensure that frames are not deformed or damaged by grout forces.
    b. Coat frames required to be grouted on the interior of the frame assembly with coal tar epoxy, or approved equal product.

3. In metal-stud partitions, install at least 3 wall anchors per jamb at hinge and strike levels. In steel-stud partitions, attach wall anchors to studs with screws.
4. Install fire-rated frames according to NFPA 80.

C. Sound Seals: When seals have been preinstalled and prefitted in the factory

and removed for shipping, install separately furnished gasketing and adjust according to manufacturerôs instructions.

D. Door Installation: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100.

1. Fire-Rated Doors: Install with clearances specified in NFPA 80.
2. Smoke-Control Doors: Comply with NFPA 105.

3.02 FIELD TESTING

A. Testing Agency: Engage a qualified independent testing agency to perform sound control field testing.

B. Selection: Architect, in consultation with the Contractor, will randomly select completely installed sound control doors for testing.

C. Testing Requirements: Independent testing agencyôs services include the following:

1. Field tests conducted according to ASTM E 336, with results calculated according to ASTM E 413, to confirm that the operating field STC values are within 5 dB of laboratory STC values.

2. Test results reported promptly and in writing by testing agency to Owner, Contractor, and Architect.

D. Repair or replace components of sound control doors where test results indicate STC rating does not meet requirements.

3.03 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items just before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including doors or frames that are warped, bowed, or otherwise unacceptable.

B. Prime-Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

C. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION 08110

SECTION 08411
STORE FRONTS

PART I - GENERAL

1.01 GENERAL PROVISIONS

A. The drawings and General Provisions of the Contract, including the Conditions of the Contract (General Supplementary, and other Conditions, if any) and Divisions 1 as appropriate, apply to the Work specified in this Section.

1.02 WORK INCLUDED

A. Aluminum entrance doors, frames and hardware as shown.
B. Aluminum storefront work.
C. Aluminum window inserts in storefront.
D. All required trim and accessories.
E. Caulking and sealant.

1.03 RELATED WORK

A. Section 08520: Aluminum Windows.
B. Section 08412: Aluminum Entrance Doors
C. Section 08100: Tempered Glass and Glazing.

1.04 REFERENCE STANDARDS

A. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes and Tubes.
B. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
C. FS TT-S-00230 - Sealing Compound: Elastomeric Type, Single Component (for Caulking, Sealing and Glazing in Buildings and Other Structures).

1.05 SUBMITTALS

A. Submit the following in accordance with Section 01300:

1. Shop Drawings.
2. Manufacturer's Product Data.
3. Finish Samples

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable manufacturers and products:

1. Aluminum Framing Systems: Kawneer 1600 Wall System.
2. Aluminum Entrance Doors: Kawneer 500 wide style.
3. Insert Windows: Kawneer Sealair.

B. Equivalent products of other manufacturers may be proposed for approval during bidding.

2.02 MATERIALS - GENERAL

A. Aluminum Members: Provide alloy and temper 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 or plate.

B. Fasteners: Provide fasteners of aluminum, nonmagnetic stainless steel, or other materials warranted by the manufacturer to be noncorrosive and compatible with aluminum components, hardware, anchors and other components.

C. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.125" thick, reinforce the interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard noncorrosive pressed-in splined grommet nuts.

D. Exposed Fasteners: Except where unavoidable for application of hardware, do not use exposed fasteners. For the application of hardware, use fasteners that match the finish of member or hardware being fastened.

E. Provide Phillips flat-head machine screws for exposed fasteners.
F. Concealed Flashing: Provide 26 gage minimum dead-soft stainless steel, or 0.026" minimum extruded aluminum of alloy and type selected by manufacturer for compatibility with other components.

G. Brackets and Reinforcements: Where feasible, provide high-strength aluminum brackets and reinforcements; otherwise provide nonmagnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.

H. Concrete/Masonry Inserts: Provide concrete and masonry inserts fabricated from cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM 386.

I. Compression Weather-stripping: Provide the manufacturer's standard replacement compressible weather-stripping gaskets of molded neoprene complying with ASTM D 2000 or molded PVC complying with ASTM D 2287.

J. Glass and Glazing Materials: Glass and glazing materials shall comply with requirements of Section 08100.

2.03 COMPONENTS

A. Storefront Framing System (Kawneer 1600): Provide inside-outside matched resilient flush-glazed storefront framing system with provisions for glass replacement. Shop-fabricate and preassemble frame components where possible.

B. Thermal-Break Construction: Fabricate storefront framing system with integrally concealed, low conductive thermal barrier, located between exterior materials and exposed interior members to eliminate direct metal-to-metal contact. Use manufacturer's standard construction that has been in use for similar projects for period of not less than 3 years.

D. Stile and Rail Type Aluminum Doors (Kawneer 500)

1. Frame: Provide tubular frame members, fabricated with mechanical joints using heavy inserts reinforcing plates and concealed tie-rods or j-bolts.

2. Design: Provide 1-3/4" thick doors of wide stile (5" as shown) design. Minimum size door is 3'0" x 7'0".

3. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of stiles and rails. Configuration of stops shall be shown on drawings.

4. Mullions: Mullions shall be steel removable style supplied by the finish hardware supplier.

5. No glazing is to go to floor without protective bars or mullions at 36" (both sides).

2.04 FABRICATION

A. Conform to manufacturer's specifications.

2.05 FINISH

A. Finish all exposed aluminum with manufacturer's standard multi-coat thermo-cured system composed of specially formulated primer and fluorocarbon top coats complying with AAMA 605.2 (Kynar). Color to be chosen by Owner.

PART 3 EXECUTION

3.01 INSTALLATION

A. Comply with manufacturer's instructions and recommendations.

B. Install all elements plumb, straight, square and level and at proper elevation and in alignment with other work. All joints between interior metal and masonry and between interior glass framing and mullion members shall be caulked tightly in order to secure a watertight job. All materials shall be screwed in place using backing, masonry plugs or anchor straps as required. Thresholds are to be set in full bed of sealant.

C. Where moldings are joined, they shall be cut and fitted accurately to result in a tightly closed joint.

D. Adjust doors and hardware to function properly and for tight fit.

3.02 PROTECTION

A. After erection, adequately protect from damage by grinding and polishing machines, plaster, lime, acid, cement or other harmful compounds.

3.03 CLEANING

A. Remove protective materials and clean materials with plain water or water with soap or household detergent, being careful to use materials which will not damage frame or glazing material. Consult with manufacturer for instructions.

END OF SECTION

08412

ALUMINUM ENTRANCE DOORS

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnish all necessary materials, labor and equipment for the complete installation of the aluminum swing doors and door frames as shown on the drawings and specified herein.

B. Furnish and install glass framing, vertical and horizontal mullions; transition members connecting these components.

C. Furnish and install perimeter sealing and glazing of all systems (see 08100 Tempered Glass for glazing type specification).

1.02 WORK NOT INCLUDED

A. For glazing type and performance ï see section 08100 Tempered Glass.

1.03 QUALITY ASSURANCE

A. Manufacturer of aluminum entry doors shall regularly and presently manufacture these doors as one of its principal products, and shall have done so for a period of not less than five (5) years.

B. The door installation sub-contractor shall have installed the door type to be provided on this project, on a regular basis for a period of not less than three years.

C. The following references shall be used as a standard of quality and performance for referenced materials: American Architectural Manufacturers Association (AAMA):

2605-05 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coating on Aluminum Extrusions and Panels
TIR A8-04 Structural Performance of Composite Thermal Barrier Framing Systems QAG-1-98 Quality Assurance Processing Guide for Poured and Debridged Polyurethane Thermal Barriers
American Society for Testing and Materials (ASTM):
B151/B151M-05 Standard Specification for Copper-Nickel-Zinc Alloy (Nickel Silver) and Copper-Nickel Rod and Bar B221-06 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes B221M-07 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes [Metric] B633-07 Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel

E283-04 - Standard Test Method for Determining Rate of Air Leakage Through

Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen

E331-00 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference

F468-06 - Standard Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use F593-02e2 Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs American Welding Society (AWS) D1.2/D1.2M:2006 Structural Welding Code - Aluminum National Association of Architectural Metal Manufacturers (NAAMM): AMP 500 Series-1988 Metal Finishes Manual

1.04 PERFORMANCE CRITERIA REQUIREMENTS

A. Structural: Resistance to corner racking shall be tested by the Dual Moment Load test as follows:

Test section shall consist of a standard top door corner assembly side rail section shall be 24" long and top rail shall be 12" long. Anchor "top rail" to test bench so that corner protrudes 3" beyond bench edge. 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". Test section shall withstand a load of 270 pounds on the lever arm before reaching the point of failure, which shall be considered a rotation of the lever arm in excess of 45 degrees.

B. Air Infiltration: (Applies only to single acting offset pivot or butt hung entrances.) Air infiltration shall be tested in accordance with ASTM E283, at a pressure differential of 1.567 PSF (75 Pa.). A single 3'0" x 7'0" (914.4 x 2133.6) entrance door and frame shall not exceed .50 CFM per linear foot of perimeter crack. A pair of 6'0" x 7'0" (1828.8 x 2133.6) entrance doors and frame shall not exceed 1.0 CFM per linear foot of perimeter crack.

1.05 SUBMITTALS

A. Furnish shop drawings for approval indicating all pertinent information to the furnishing and installing of the aluminum entrance doors.

B. Furnish two copies of manufacturer's latest published literature and two copies of certificates of test reports required (see paragraph 1.03 above).

C. Furnish two copies of the manufacturer's current recommended methods of installation and illustration of full compatibility with entry framing.

D. Submit sample warranty with shop drawings for review and approval. This warranty shall comply with the requirements of the *WARRANTY* section below.

1.05 WARRANTY

A. This contractor shall guarantee the aluminum entry door installation against defective materials and workmanship for a period of two (2) years following date of substantial completion for the project.

B. Included in the warranty shall be a provision and agreement to repair or replace, at the contractor's expense, all defective material or deficient installation within the warranty period.

C. This warranty shall be submitted to the Architect at the conclusion of the project for approval of the format and content of the warranty, and upon approval, shall be included with other warranties presented to the owner with the close-out documents.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable wide stile (high traffic) aluminum entrance doors with the compatible frame systems shall include and be limited to the following manufacturers: Series 500 doors Kawneer (770) 449 ï 5555 www.kawneer.com #550 Wide Stile U.S. Aluminum (800) 462 ï 5668 www.usalum.com 50D HD Wide StileYKK AP America Inc. (678) 838 ï 6000 www.ykkap.com. or approved substitution.

B. For reference purposes, storefront nomenclature used in this specification shall be based upon the Kawneer door system.

C. Where aluminum entrance doors occur as a component in an aluminum glazing framing system, door and glazing framing system shall be by the same manufacturer, and shall be of compatible systems intended for use together.

2.02 MATERIALS

A. Extrusions shall be 6063-T5 alloy and temper (ASTM B221 alloy G.S. 10A-T5). Fasteners, where exposed, shall be aluminum, stainless steel or plated steel in accordance with ASTM B633. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from the aluminum. Glazing gaskets shall be EPDM elastomeric extrusions. Major portions of the door stiles shall be .125" (3.2) in thickness and glazing molding shall be .050" thick.

B. Accurately form metal parts and accurately fit and rigidly assemble joints, except those joints designed to accommodate movement. Seal joints to prevent leakage of both air and water.

C. Make welds in accordance with the recommended practice of the American Welding Society. Use electrodes and methods recommended by the manufacturers of the alloys being welded. Make welds behind finished surfaces so as to cause no distortion or discoloration of the exposed side. Clean welded joints of welding flux and dress exposed

and contact surfaces.

D. Make provisions in doors and frames to receive the specified hardware and accessories. Where concealed closers or other mechanisms are required, provide the necessary space, cutouts, and reinforcement for secure fastening.

2.03 STILE AND RAIL DOOR CONSTRUCTION

A. Wide stile doors shall have a minimum nominal 5 inch vertical stile and head rail and bottom rail of minimum nominal 6 ½ò width.

B. Bevel single-acting doors 1/8-inch at lock, hinge and meeting stile edges. Provide clearances of l/l6-inch at hinge stiles, 1/8-inch at lock stiles and top rails, and 3/16-inch at floors and thresholds. Form glass rabbets integrally with stiles and rails. Glazing beads may be formed integrally with stiles and rails or applied type secured with fasteners at six inches on centers.

C. Construct doors with a system of welded joints or interlocking dovetail joints between stiles and rails. Clamp door together through top and bottom rails with 3/8-inch cadmium plated steel rod extending into stiles, and having a self-locking nut and washer at each end. Reinforce stiles and rails to prevent door distortion when tie rods are tightened. Provide a compensating spring-type washer under each nut to take up any stresses that may develop. Construct joints between rails and stiles so as to remain rigid and tight when door is operated.

D. Weatherstripping: Use Kawneer SealAir® weathering system or provide removable, woven wool pile type (silicone-treated) weatherstripping attached to aluminum or vinyl holder. Make slots for applying weatherstripping integral with doors and door frame stops. The door bottom rail will be weathered with an EPDM blade gasket sweep strip applied with concealed fasteners. Apply continuous weatherstripping to heads, jambs, bottom, and meeting stiles of doors and frames. Install so as to permit doors to swing freely and close positively.

2.04 REINFORCEMENT FOR BUILDERS HARDWARE

A. Fabricate from stainless steel plates as follows: Hinge and pivot reinforcing 0.1793 inch thick Reinforcing for lock face, flush bolts, concealed holders, concealed or surface mounted door closers 0.1046 inch thick Reinforcing for all other surface mtd. hardware 0.0598 inch thick

2.04 HARDWARE

A. Hardware for aluminum entrances shall be furnished and installed in the doors by the door manufacturer, and shall include the following:

Panic Devices: Kawneer Paneline® with Style G-3 Pull or comparable devices as provided by the door manufacturer with built in Request To Exit device.

Push-Pull Devices: Kawneer Paneline® Fixed Panel with Style G-3 Pull or comparable system as provided by door manufacturer.

Closers: Norton 1605 Surface Closer with Back Check and Adjustable hold open or comparable as provided by door manufacturer.

Pivots: Kawneer Standard top, bottom, and intermediate offset pivots per leaf, or comparable pivots as provided by door manufacturer.

Thresholds: 6-3/4" x 1/2" aluminum mill finish thresholds width to match framing system opening width.

Cylinders and Locks: As required to accommodate existing keying system.

2.05 FINISH

A. All exposed framing surfaces shall be free of scratches and other serious blemishes.

B. Finish all exposed aluminum surfaces as follows:

1. Fluorocarbon Finish: AAMA 2605, high performance organic coating or AA-R1S Fluorocarbon resin coating, commercially known as Kynar®, consisting of a epoxy prime coat of 0.02 mil dry film thickness and a polyvinylidene Fluoride (PVF) (MIL-P-46l22B, Type II, Grade A) 0.80 mil dry film thickness. Applicator and method of application shall be approved by the coating formulator. Color ï to match existing

2.06 GLAZING

A. Refer to drawings and section 08100 Tempered Glass of this specification for type of glass and general method of glazing.

B. All aluminum entrance doors shall have 1" single pane glazing.

C. Where aluminum entrance doors occur as a component in an aluminum glazing framing system, door glazing shall match the glass tint and color characteristics of the window portions of the aluminum glazing framing system.

PART 3 EXECUTION

3.01 INSTALLATION

A. All jambs, head and sill track shall be set in correct locations as shown in the details and shall be level, square, plumb and in alignment with other work in accordance with the manufacturer's installation instructions and approved shop drawings. All joints between framing and the building structure shall be sealed in order to secure a watertight installation.

3.02 PROTECTION AND CLEANING

A. After installation, the general contractor shall adequately protect exposed portions of aluminum surfaces from damage by grinding and polishing compounds, plaster, lime, acid, masonry cleaning chemicals, cement or other contaminants.

B. Thereafter, it shall be the responsibility of the general contractor to maintain protection and provide final cleaning.

END OF SECTION

SECTION 08710
DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: This Section includes the following:

1. Hinges.
2. Lock cylinders and keys.
3. Lock sets.
4. Closers.
5. Weather-stripping for exterior doors.
6. Panic devices.
7. Electrified hardware, as provided by the Owner.

1.02 QUALITY ASSURANCE

A. Finish hardware where required shall conform to the applicable requirements of the American Insurance Association, Underwriter's Laboratories, Inc., local codes and all other regulations and agencies having jurisdiction. Such items of hardware shall bear a label or mark indicating its conformance to the above requirements.

B. Manufacturer: A finish hardware manufacturer who has been successfully manufacturing products of the type specified for not less than 5 years. Each type of finish hardware or accessory shall be obtained from only one manufacturer.

C. Supplier: Finish hardware supplier who have been furnishing finish hardware, for a period of not less than 2 years. The finish hardware supplier shall be or have in employment an Ownerural Hardware Consultant (AHC) in good standing as certified by the Society of Ownerural Hardware Consultants Council. Each supplier shall be available as required during the course of the work for project hardware consultation to the Owner and Contractor. Upon completion of the work each supplier shall inspect their installations with manufacturer's representatives and submit a letter to the Owner advising that all items required have been installed and are operating properly.

D. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction,

and marked for intended use.

1.03 REFERENCES

A. Comply with applicable provisions of the following reference standards except as otherwise shown or specified.

1. Building Hardware Manufacturer's Association (BHMA).

2. Underwriter's Laboratories (UL).

3. United States Standards (US).

4. Hollow Metal Manufacturer's Association, Division of the National Association of Ownerural Metal Manufacturers.

5. American National Standards Institute (ANSI).

6. Door and Hardware Institute (DHI).

1.04 SUBMITTALS

A. Hardware supplier shall prepare and submit for approval 6 copies of the complete detailed hardware schedule. This shall be done within 30 working days after receipt of Award of Contract.

B. The Owner will check the schedule submitted for quality and types, but the supplier of hardware shall be solely responsible for any errors or omissions of the schedules, and all security hardware equal in kind and quality to that herein specified or required shall be supplied.

C. Identify hardware items unsuitable for use as scheduled.

D. If requested by the Owner, a sample of each hardware item will be supplied as required for comparison with hardware as furnished. Any deviation from hardware schedule shall be replaced with the proper hardware at hardware supplier's expense.

E. Templates and/or shop drawing information shall be sent to each manufacturer who requires such information. Approved hardware schedule shall be sent to each manufacturer who requires template information.

F. Maintenance instructions.

1.05 PRODUCT HANDLING

A. As hardware is received, sort and repackage in containers marked with the hardware set number.

B. Upon delivery to jobsite, Contractor's representative shall inventory the delivered hardware with a representative of the hardware supplier. Both Contractor and supplier shall be satisfied that the count is correct before delivery is accepted. Copies of all shipping and receiving reports shall be forwarded to the Owner.

C. Hardware installer shall provide secure lock-up for hardware that is not installed. Control the handling and installation of hardware items which are not immediately replaceable, so that the completion of the work will not be delayed by hardware losses, both before and after installation.

1.06 JOB CONDITIONS

A. Coordination: Coordinate hardware with other work. Tag each item or package separately, with identification related to the hardware schedule, and include basic installation instructions in the package. Provide hardware items of proper design for door thickness, profile, swing, security and similar requirements, for proper installation and function. Deliver individually packaged hardware items at the proper times to the proper locations for installation.

B. Product Information: Furnish hardware templates installation instructions and wiring diagrams as required to each fabricator of doors and frames to be factory-prepared for the installation of hardware. Upon request, check the shop drawings of such other work, to confirm that adequate provisions are made for the proper installation of hardware.

1.07 ATTIC STOCK

A. Furnish full-size units of door hardware described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Hinges, Latches and Closers: 5% of the amount installed of each type of hardware, unless otherwise requested by the Owner.

PART 2 - PRODUCTS

2.01 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of builders' hardware are indicated. Products are identified by using appropriate hardware designation numbers.

B. One or more manufacturers are listed for each hardware type required. Provide either the product designated, or the equivalent product of one of the other listed manufacturers. Provide products of a single manufacturer for each product type.

2.02 MATERIALS AND FABRICATION, GENERAL

A. The drawings show the direction of movement of each door leaf. Furnish each item of hardware for proper installation and operation of the door movement as shown.

B. Do not use manufacturer's products which have manufacturer's name or trade name in a visible location, except in conjunction with required UL labels.

C. Provide hardware units of no lesser quality than specified. Do not furnish "optional" materials or forming methods for those indicated.

D. Fasteners: Manufacture hardware to conform to published templates, generally prepared for machine screw installation. Do not furnish hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

1. Provide concealed fasteners for hardware units which are exposed when the door is closed, except to the extent no standard units are available with concealed fasteners. Standard exposed fasteners shall be modified to render the installations tamper proof and vandal resistant, but readily serviceable for maintenance. Welded covers will not be acceptable.
2. Contractor shall furnish all tools and equipment necessary for the proper installation and attachment of security fasteners required for this project.

E. Should any hardware, even though required by the Contract Drawings or Specifications, fail to meet the intended requirements or require modification to suit or fit the designated location, such correction and modification shall be made as necessary and in ample time to void delay in the manufacture and delivery of the hardware. Changes and modifications shall not be made without prior notification, and approval, by the Owner. The Contractor shall make such corrections and modifications as directed and approved without extra cost to the Owner.

F. Coordinate with the Owner for materials and installation of electrical exit devices.

1. Where required or instructed by the Owner, engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain electrified door hardware.

2.03 HINGES

A. Hinges: As manufactured by the following or otherwise scheduled:

1. Stanley Mfg. Co. (specified)
2. Hager Hinge Co.
3. McKinney

B. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

1. Out-Swing Exterior Doors: Non-removable pins.
2. Interior Doors: Non-rising pins.

C. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90 inches or less in height and one additional hinge for each 30 inches of additional height.

D. Continuous hinges shall conform to ANSI/BHMA A156.1. Spring hinges shall conform to A156.17.

E. Antifriction-Bearing, Swing-Clear, (Two-Way) Hinges: BHMA A156.1, heavy weight; Grade 1, with 4 ball bearings; button tips; nonrising removable pins; reversible; fabricated to allow door to swing 180 degrees.

F. Power Transfer Hinges (Where required): Concealed PTFE-jacketed wires, secured at each leaf and continuous through hinge knuckle.

G. Products: Provide the following, by Stanley, or approved equal:

1. Spring Hinges: 42-0920.

2.04 OVERHEAD CLOSERS

A. Concealed Closers: LCN 6030 Packer Concealed Closer.

C. Closers are required to be accessible to the physically handicapped. Provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.

D. Closers scheduled for fire labeled doors shall bear Underwriter's Laboratories, Inc. approval.

E. Closers shall have secure arms and covers, without indentations or other design features.

F. Closers shall be sized in accordance with the accepted manufacturer's standards to suit height, width, weight of door and draft conditions.

G. Closers shall conform to ANSI/BHMA A156.4.

H. Provide parallel arm closers with integral stops for doors with closers that swing more than 120 deg.

2.05 LOCKS, EXIT DEVICES

A. Acceptable Manufacturers/Design

1. Sargent ï Mortise Lock 8200 Series Facility Standard; Controlled Exit Device shall be Von Duprin ï CX98/99 Series Rim Device.

B. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, and as follows:

1. Strikes for Mortise Locks and Latches: BHMA A156.13.

C. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

D. Emergency Release Devices: Strike-release device, in which Mechanism, serving as a doorstop, can be released to allow door to swing in the outward position. Mechanism shall extend the full jamb depth/width and be either surface mounted or mortised into the strike jamb. Equipped with double acting pivot for a cased opening frame.

1. Product: Provide emergency Release Strikes as manufactured by Steelcraft Manufacturing, Co.

E. Door Trim: LSL Trim.

F. Locks shall comply with ANSI/BHMA A156.13.

G. Where indicated, provide door locks with Storeroom or Service Function (04).

1. Provide doors with freewheeling function on exterior or corridor side of doors as indicated on the drawings.

2.06 CYLINDERS AND KEYING

A. Provide locks with 6-pin mortise type cylinders which comply with performance requirements of ANSI A156.5.

2. Provide factory construction master keying for the Contractor's use.
3. Provide cylinders and keying system that is compatible with and consistent with the existing hardware design and configuration.

B. Supplier shall provide for a masterkeyed system and will meet with the Owner and Owner to determine additional keying requirements. The Contractor shall obtain final instructions in writing. The keying schedule will be forwarded to the Contractor by the Owner upon acceptance of the shop drawings and hardware schedule.

C. Keys: Furnish individual change keys for each lock which is not designated to be keyed alike with a group of related locks.

1. Key Material: Provide keys of nickel silver only.

2. Key Quantity: Furnish 3 change keys for each lock and 5 master keys for each master system. Provide 6 construction master keys.

3. Deliver keys to the Owner at Final Completion.

D. Product: Provide Medeco Keymark cylinders.

2.07 BOLTS

A. Bolts: BHMA A156.16, Grade 1.

1. Rockwood.
2. Glynn-Johnson.
3. Baldwin.

B. Provide extension type flush bolts. Provide each bottom flushbolt with a dustproof strike. Provide curved faces where required.

1. Dutch Door Bolts: Polished-brass bolt and knob, minimum 3/4-inch throw, with standard strike

2.08 STOPS AND HOLDERS

A. Combination Overhead Stops and Holders: BHMA A156.8, Grade 1.

B. Silencers for Metal Door Frames: BHMA A156.16, Grade 1; neoprene or rubber, minimum diameter 1/2 inch; fabricated for drilled-in application to frame.

1. Provide silencers for all non-gasketed frames. Provide 3 for each single swing door and 2 for pairs of doors.

C. Manufacturer: Provide door stops as indicated on the hardware schedule, as manufactured by one of the following:
1. IVES Hardware.
2. Glynn-Johnson.
3. Rockwood Manufacturing Company.

2.09 THRESHOLDS

A. Standard: BHMA A156.21.

B. Accessibility Requirements: Where thresholds are indicated to comply with accessibility requirements, comply with the U.S. Ownerural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines for Buildings and Facilities (ADAAG)."

1. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.

2.10 PROTECTIVE TRIM UNITS

A. Size: 1-1/2 inches less than door width on push side and 1/2 inch less than door width on pull side, by 9 inches high or as specified on the Drawings.

1. Fasteners: Manufacturer's standard machine or self-tapping screws.

B. Metal Protective Trim Units: BHMA A156.6; beveled top and 2 sides; fabricated from brass, bronze or a otherwise indicated.

2.11 FINISHES

A. Finishes of all hardware shall match the finish of the locksets, except where noted. Take special care to coordinate all of the various manufactured items furnished under this section to ensure acceptable uniform finish.

B. Materials and finishes shall comply with ANSI/BHMA A156.18.

PART 3 - EXECUTION

3.01 GENERAL

A. Furnish suitable templates, together with the reviewed finish hardware schedule, to the respective trades as required, to insure the accurate setting and fitting of finish hardware.

3.02 HARDWARE APPLICATION

A. Locate hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute, except as specifically indicated or required to comply with governing regulations and except as may be otherwise directed.

B. 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, coordinate removal, storage and reinstallation or application of surface protections with finish work specified in the Division-9 Sections. Do not install surface-mounted items until finishes have been

completed on the substrate.

C. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

D. Drill and countersink units which are not factory-prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

3.03 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly as intended for the application made.

B. Demonstrate to the Owner that each item is in perfect working order and that tagged keys operate respective locks. Correct items of hardware not acceptable to the Owner. Deliver tagged keys to the Owner upon acceptance of each core cylinder installation.

C. Adjust door control devices to compensate for final operation of heating, cooling and ventilation equipment.

3.04 HARDWARE SETS

A. General: Provide hardware as specified within this Section, and as indicated on the Drawings in sets, subject to the approval by the Owner.

END OF SECTION

SECTION 09260
GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: The Work of this Section includes, but is not limited to, the following:

1. Steel framing members to receive gypsum board.
2. Gypsum board wall applications screw-attached to steel framing and furring systems.
3. Drywall finishing with joint tape-and-compound.
4. Acoustical insulation and sealant for gypsum board products.
5. Metal reveals and trims.

1.02 SYSTEM DESCRIPTION

A. Performance Requirements, General: Provide gypsum board wall systems complying with performance requirements specified, as demonstrated by pre-testing manufacturer's corresponding stock systems.

B. Structural Requirements: Provide gypsum board shaft-wall assemblies capable of withstanding following lateral design loadings (air pressures) for maximum heights of partitions without failing. Evidence of failure includes deflections exceeding limits indicated, bending stresses causing studs to break or to distort, and end-reaction shear causing track (runners) to bend or to shear and studs to become crippled. Comply with requirements of the State of Connecticut Building Code and with SA923 of United States Gypsum Company for loading performance criteria.

1. Lateral Loading: 7.5 psf, unless otherwise indicated.
2. Deflection Limits: 1/240 of partition height.

C. Fire-Resistance Ratings: Where indicated, provide materials and construction which are identical to those of assemblies, including those incorporating elevator door and other framing, whose fire resistance has been determined per ASTM E 119 by a testing and inspecting organization acceptable to authorities having jurisdiction.

1. Provide fire-resistance rated assemblies identical to those indicated by reference to GA File No.'s in GA 600 ñFire Resistance Design Manualò or to design designations in UL ñFire Resistance Directoryò or in listings of other testing and inspecting agencies acceptable to authorities having jurisdiction.

D. Sound Attenuation Performance: Provide gypsum board wall systems designed and pre-tested to achieve the following minimum ratings for sound transmission class (STC) per

ASTM E 90.

1. STC Rating: 50, unless otherwise indicated.

1.03 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for materials for gypsum drywall and backer board. Submit other data as required to show compliance with these specifications.

B. Shop Drawings: Show locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.

C. Samples: Submit 12" long samples of each type of trim accessory.

1.04 QUALITY ASSURANCE

A. Fire-Resistance Rating: Where ratings are indicated, match 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.

B. Gypsum Board Terminology Standard: GA-505 by Gypsum Association.

C. Installer: Firm with not less than 5 years of successful experience in the installation of specified materials.

D. General: Ceiling installations shall conform to applicable requirements of the State of Connecticut Building Code, including seismic requirements.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packaging, bearing brand name and identification of manufacturer or supplier.

B. Store materials to keep them dry and protected from soiling, dirt or damage. Neatly stack gypsum boards flat to prevent sagging.

C. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect trim accessories from being bent or damaged.

1.06 PROJECT CONDITIONS

A. Environmental Requirements: Comply with referenced standards and recommendations of

gypsum board manufacturer, for environmental conditions before, during and after application of gypsum board.

1. Contractor shall not begin drywall work until surrounding building construction is enclosed and weather tight.

B. Cold Weather Protection: When air is below 55 deg. F maintain temperature of not less than 55 deg. F for at least 48 hours before, during and after application of joint treatment materials.

C. Ventilation: Ventilate building spaces to dry joint treatment material. Avoid drafts during dry, hot weather.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering gypsum board systems which may be incorporated in the Work include but are not limited to the following:

1. Steel Framing and Furring:

   a. Gold Bond Building Products Division.
   b. Marino Industries Corp.
   c. U.S. Gypsum Co.

2. Gypsum Boards Trim and Related Products:

   a. G-P Gypsum.
   b. National Gypsum Company.
   c. USG Corporation.

2.02 WALL AND PARTITION FRAMING

A. General: Provide wall and partition framing including, but not limited to, tracks, outriggers, bracing, shoes, and other devices as required for a complete assembly.

B. Partition Framing: ASTM C 645; 22 gage (minimum) thickness of base metal, unless otherwise indicated or required to meet performance criteria specified within this Section.

1. Depth of Section: Standard sizes as shown.
2. Runners: Match studs; type recommended by stud manufacturer.

C. Furring Members: ASTM C 645; 0.0179" minimum thickness (25 gage) of base metal, hat-shaped, or ñCò-shaped studs as indicated on drawing.

D. Z-Furring Members: Standard screw-type galvanized steel, "Z"-shaped furring members complying with ASTM `A 525, G60, 0.0179" min. thickness; of depth to suit insulation thickness indicated.

E. Fasteners for Furring Members: Type and size recommended by furring manufacturer for the substrate and application indicated.

F. Concealed Steel Reinforcing: Provide galvanized steel strip reinforcing, 16 gauge by 8 inch wide by lengths indicated for reinforcement of surface applied handrails and similar attachments to drywall construction.

G. Structural Framing Members: ASTM C 955 studs and runners of size, shape and gage as recommended by manufacturer for shaft walls.

2.03 GYPSUM BOARD

A. Gypsum Wallboard: ASTM C 36, ñType Regularò in standard lengths as required with conventional tapered edges, 5/8" thick unless otherwise indicated.

1 Fire Rated Gypsum Board: ASTM C 36, "Type X" fire-rated, in standard lengths as required with conventional tapered edges, 5/8" thick unless otherwise indicated.

B. Water-Resistant Backing Board: ASTM C 630, of type indicated, in standard lengths as required with conventional tapered edges, 5/8" thick unless otherwise indicated.

1. Provide ñW/R Firecode 'C' Panelsò where both water resistant and fire resistant are required.

C. Cementitious Backer Board: Provide panels which comply with ANSI A118.9; panels composed of concrete core with glass fiber mesh reinforcing on both faces covered with Portland cement; 3.4 lbs. per sq. ft.; 1/2" thickness.

1. Subject to compliance with requirements, provide the following, or approved equal:

a. ñDurock Cement Boardò by United States Gypsum Co.

2.04 TRIM ACCESSORIES

A. General: Except where shown otherwise, provide manufacturer's standard trim accessories for drywall work, formed of galvanized steel with either knurled and perforated or expanded flanges for nailing or stapling, and beaded for concealment of flanges in joint compound.

B. Steel Edge Trims: ASTM C 1047; standard trim accessories of types required for drywall work, formed of galvanized steel and beaded for concealment of flanges in joint compound.

1. Provide corner beads at external corners, L-type edge trim-beads, and one-piece control joint beads. Provide U-type edge trim beads where indicated.

2.05 JOINT TREATMENT MATERIALS

A. General: ASTM C 475; of type recommended by the manufacturer.

B. Joint Tape: Paper reinforcing tape.

1. Backer Board: 10 by 10 glass mesh, unless otherwise indicated.

C. Joint Compound: Ready-mixed vinyl-type for interior use. Provide 2 separate grades; one specifically for bedding tapes and filling depressions, and one for topping and sanding.

1. Joint Compound, Backer Units: As recommended by board/panel manufacturer.

D. Water-Resistant Joint Materials: Water-resistant types for use at moisture-resistant gypsum board and ceramic tile backer board, as recommended by manufacturer(s).

2.06 MISCELLANEOUS MATERIALS

A. General: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board.

B. Gypsum Board Screws: Comply with ASTM C 1002, for fastening gypsum board to type of framing or substrate material indicated.

C. Concealed Acoustical Sealant: Non-drying, non-hardening, non-staining, non-bleeding sealant for concealed applications per ASTM C 919.

D. Exposed Acoustical Sealant: Non-oxidizing, skinnable, paintable, gunnable sealant for exposed applications per ASTM C 919.

E. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

F. Asphalt Felt: ASTM D 226, Type 1 (No. 15).

G. Laminating Adhesive: Water-resistant adhesive as recommended by gypsum board

manufacturer for laminating gypsum boards.

H. Leveling and Patching Compound: Latex cement as recommended by gypsum board manufacturer.

I. Water: Clean and free of deleterious material.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates to which drywall construction attaches or abuts, preset hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of drywall construction. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Ceiling Anchorages: Coordinate work to ensure that inserts and other anchorage provisions have been installed for ceiling hangers.

B. Where required, attach offset anchor plates to surfaces indicated. Provide continuous units fastened to building structure not more than 24 inches o.c. and to ceiling runners.

3.03 INSTALLATION OF FRAMING, GENERAL

A. Installation Standard: Comply with ASTM C 754 and ASTM C 840. Provide support for all edges of gypsum board. Use screw fasteners only.

B. Install supplementary framing and bracing at terminations in the work and other construction.

1. Where wall mounted millwork and other accessories requiring blocking which are attached to drywall, provide a flat continuous galvanized steel strip or solid wood blocking nested in wall framing, behind gypsum board panels.

C. Isolate steel framing from building structure to prevent transfer of structural loading, at locations indicated below.

1. Where edges of suspended ceilings abut building structure.

2. Where partition and wall framing abuts overhead structure.

D. Do not bridge building expansion joints with support system; frame both sides of joints with furring and other support.

E. Framing location tolerance shall not exceed 1/4". Install framing and furring with adjacent fastening surfaces aligned within 1/8 inch of each other.

F. Construction Tolerances: In addition to the reference standards specified, construct framing and substrates to comply with the following maximum tolerances.

G. Install structural studs, runners and other framing/supports, to comply with performance requirements and manufacturer's recommendations.

3.04 WALL AND PARTITION FRAMING

A. Install runner tracks at floors and structural walls and at columns where gypsum drywall stud system abuts other work. At exterior walls, install asphalt felt strips between wall and framing, or leave 1" gap, as indicated on the drawings.

B. Extend partition stud system through ceilings to the structural support above the ceiling, unless otherwise indicated.

C. Space studs and wall furring 24" o.c. maximum, unless otherwise indicated or required to meet performance characteristics within this Section.

1. Multilayer construction, backer units, and where indicated; space studs 16" o.c., unless otherwise indicated.

D. Frame door openings to comply with recommendations of gypsum board manufacturer, or with ñGypsum Construction Handbookò by United States Gypsum Co. Screw studs to jambs of door frames; install runner track at head of frame and secure to jamb studs.

1. Use doubled-up studs at the jambs, extending from floor to slab above. Brace studs where required.
2. Install cripple studs in runner track above door frame.
3. Frame openings, other than door openings, with framing below sills of openings to match framing above door heads.

E. Frame openings, other than door openings, in same manner as required for door openings; and install framing below sills of openings to match framing above door heads.

F. Reinforce all studs cut for passage of pipes and conduit.

G. Install structural studs, runners and other framing/support for cementitious tile backer board to comply with performance requirements and manufacturer's recommendations.

H. Install insulation between framing or furring members where indicated. Until gypsum board is installed, hold insulation with wire staples.

3.05 GYPSUM BOARD APPLICATION AND FINISHING, GENERAL

A. Application and Finishing Standards: ASTM C 840.

B. Install acoustical insulation prior to gypsum board unless readily installed after board has been installed.

C. Locate exposed end-butt joints away from center of walls, and stagger not less than 1'-0" in alternate courses.

D. Install wall and partition boards vertically to avoid end-butt joints wherever possible. At high walls, install boards horizontally with end joints staggered over studs.

1. Install moisture-resistant and backer boards for ceramic tile where indicated and as required.

E. Install gypsum board with face side out. Do not install defective or damp boards. Butt boards lightly together with not more than 1/16" space between boards. Do not force into place.

F. Locate edges and ends over supports, so that like edges abut, tapered edges against tapered edges and cut ends against cut ends. Stagger joints over different studs on opposite sides of partitions.

G. Provide framing and blocking for support at openings and cutouts.

H. Form control joints to receive trim accessories. Locate these joints to comply with manufacturer's instructions.

I. Cover both faces of partition framing with gypsum board in concealed spaces, except in chase walls which are braced internally.

1. Fit gypsum board around ducts, pipes and conduit.

J. Isolate perimeter of non-load-bearing partitions from the structure. Provide 1/4" to 1/2" space and trim edge with L-type or LC-type edge trim. Seal joints with acoustical sealant.

K. ñLò, ñUò, or ñJò type, Seal construction at perimeters, control joints, openings and penetrations with a continuous bead of acoustical sealant including a bead at both faces of partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim, and close off sound-flanking paths around or through construction, including sealing of partitions above ceilings.

L. Space fasteners in gypsum boards in accordance with referenced standards and manufacturer's recommendations.

M. Grout hollow metal frames. Except where full grouting is required for fire-resistance rating, grout 6" lengths at each anchorage.

N. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

3.06 SINGLE-LAYER APPLICATION

A. On ceilings apply gypsum board prior to wall and partition board application to the greatest extent possible.

B. On partitions and walls apply gypsum board vertically, and provide sheet lengths which will minimize end joints.

C. On furring members apply gypsum board vertically with no end joints. Locate edge joints over furring members.

D. Install moisture-resistant gypsum board and backer board for ceramic tile where indicated on the drawings. Comply with manufacturer's requirements regarding installation and joint treatment.

3.07 INSTALLATION OF DRYWALL TRIM

A. General: Where feasible, use the same fasteners to anchor trim as required to fasten gypsum board. Fasten flanges of trim in accordance with manufacturer's instructions. Closely fit and align ends of trim.

B. Install metal corner beads at external corners of drywall work.

C. Install edge trim at exposed or semi-exposed edges of drywall. Install ñLò, ñUò, or ñJò type trim where work abuts other work, and where edge is exposed, revealed, gasketed, or sealant-filled.

D. Install metal control joints where indicated on the drawings, or if not indicated, at spacings and locations required by the manufacturer and approved by the Architect for visual effect.

3.08 FINISHING OF DRYWALL

A. General: Treat gypsum board joints, trim accessories, penetrations, fastener heads, surface defects and elsewhere as required for applied finishes. Prefill open joints using proper compound.

B. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

C. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

1. Level 2: Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where indicated.

2. Level 4: Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view, unless otherwise indicated.

E. Backer Board for Ceramic Tile: Treat joints and fasteners to comply with directions of gypsum board, backer board, and water-resistant joint compound manufacturers, using water-resistant joint compound(s). Do not crown the joints. Embed tape in joints and form true angles.

F. Partial Finishing: Omit third coat and sanding on concealed drywall work which requires finishing to achieve fire-resistance rating, sound rating, or to act as an air or smoke barrier.

3.10 PROTECTION OF WORK

A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall work being without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 09900
PAINTING

PART 1 - GENERAL

1.01 SUMMARY

A. Work Included: The Work of this Section includes, but is not limited to, the following:

1. Painting of interior and exterior surfaces as indicated and where required.

B. Work Not Included:

1. Pre-Finished Items: Do not include painting when shop or factory finishing is specified for such items as elevator, and mechanical and electrical equipment.
2. Concealed Surfaces: Painting is not required on surfaces in concealed and generally inaccessible areas such as pipe spaces, duct shafts and elevator shafts.
3. Operating Parts: Moving parts of mechanical and electrical devices, motor and fan shafts will not require painting.

C. Labels: Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.02 SUBMITTALS

A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

2. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples: Prior to painting, submit samples for Architect's review of each required color and texture. Identify materials used on samples. Samples shall have each coat of paint exposed the same amount and tinted slightly different than other coats.

1. On 12" by 12" hardboard, submit three samples of each color, material and texture, until sheen, color, and texture are acceptable.

2. Field Samples: On wall surfaces and other component surfaces, duplicate finishes of

prepared samples. Provide full-coat finish samples on at least 100 sq. ft. of surface until required sheen, color and texture are obtained; simulate finished lighting conditions for review of in-place work.

a. Modify each color of the field samples, a maximum of one (1) time and install a new field sample panel when directed by the Architect.

1.03 QUALITY ASSURANCE

A. Single Source Responsibility: Provide primers, fillers and undercoats produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

B. Coordination of Work: Review other sections of these specifications for shop primers, to ensure compatibility of total coatings system. Upon request from other trades, furnish information on finish materials, to ensure that compatible prime coats are used.

C. Applicator Qualifications: Engage an experienced applicator who has completed painting/coating system applications similar in materials and scope to that indicated for this Project with a record of successful in-service performance.

1. In addition, the applicator shall have not less than 5 consecutive years of professional paint experience; and be acceptable to the paint manufacturer for the application of the specified systems.

1.04 DELIVERY AND STORAGE

A. Deliver materials in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

1. Name or title of material.
2. Fed. Spec. number, if applicable.
3. Manufacturer's name, stock number and date of manufacture.
4. Contents by volume, for major pigment and vehicle constituents.
5. Thinning and application instructions.
6. Color name and number.

B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.

1. Protect materials from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from use of paints.

1.05 PROJECT CONDITIONS

A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 deg. F and 90 deg. F, unless otherwise permitted by paint manufacturer's instructions.

B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 deg. F and 95 deg. F, unless otherwise permitted by paint manufacturer's instructions.

C. Do not apply paint when relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by paint manufacturer.

D. Cover other work which might be damaged by surface preparation. Provide temporary enclosures as required to confine surface preparation, to protect the environment, persons and property.

1.06 EXTRA MATERIALS

A. Deliver stock of maintenance materials from the same manufacturers lot and production run as materials installed. Extra materials shall be enclosed in labeled, unopened cans in cartons for storage and identified with labels clearly describing the contents. Boxes shall be marked with the same finish color designation as in the submitted and accepted color schedule.
   1. Provide quantity of paint equal to 10% of the amount installed for all paint material.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, provide paint products as manufactured by one of the following, or equal acceptable to the Architect:

   1. PPG Architectural Finishes.
   2. Benjamin Moore and Company
   3. Sherman Williams.
   4. Tnemec Company, Inc.

2.02 MATERIALS

A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.

B. Volatile Organic Materials: Provide paint and coating products to comply with applicable

environmental regulations and local authorities. Federal numbers, where specified or referred to, are for guidelines only.

C. Primers and Undercoaters: Provide primers and undercoaters recommended by the finish coating manufacturer for suitability with the substrate and compatibility with finish coats.

D. Color Pigments: Pure, non-fading, to suit substrates and service.

1. Lead content in pigment, if any, is limited to contain not more than 0.5% lead, as lead metal based on the total non-volatile (dry-film) of paint by weight.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine areas and conditions of work and notify Contractor in writing of conditions detrimental to proper painting. Proceed with work after unsatisfactory conditions have been corrected.

B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

C. Do not paint over dirt, rust, scale, grease, moisture, or conditions detrimental to formation of a durable paint film.

D. Coordination of Work: Review other Sections in which primers and shop applied coatings are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible paint coatings.

1. Notify the Architect about anticipated problems using the materials specified over indicated substrates, primers and other shop applied coatings.

3.02 SURFACE PREPARATION

A. General: Perform preparation and cleaning in accordance with paint manufacturer's instructions and as herein specified.

1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems with substrates primed by others.

2. Remove hardware, accessories, lighting fixtures, and similar items not to be field-painted, or provide suitable protection. Remove items if necessary, for painting of

items or adjacent surfaces. Reinstall removed items on completion of painting.

3. Clean surfaces to be painted. Remove oil and grease prior to other cleaning. Be sure that cleaning materials do not fall onto newly-painted surfaces.

B. Preparation: Clean and prepare surfaces to be painted in accordance with the manufacturer's instructions for each particular substrate condition and as specified.

1. Ferrous Metals: Clean non-galvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with recommendations of the Steel Structures Painting Council.

   a. Blast steel surfaces clean as recommended by the paint system manufacturer and in accordance with requirements of SSPC specification SSPC-SP 10 for interior surfaces and SSPC-SP 6 for exterior surfaces.
   b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
   c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

2. Galvanized Surfaces: Clean galvanized surfaces that have not been shop primed and/or intermediate coated with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

   a. Touch-up bare and damaged areas of the shop-applied prime coat that have been damaged; wire brush, mechanically clean and/or solvent clean such areas in compliance with the manufacturers recommendations.

   b. Use the coating materials identical to those applied in the shop. Refer to other Sections of these specifications for materials and other requirements.

3. Cementitious Materials: Prepare concrete, concrete masonry block and cement plaster surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen, as required, to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

   a. For painting of interior concrete surfaces at location indicated on the drawings, fill voids, cracks or other defects and grind down to provide smooth surface.
   b. Use abrasive blast-cleaning methods if recommended by the paint manufacturer.

4. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust

off.

a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.
b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood panels.
c. When transparent finish is required, backprime with spar varnish.

3.03 MATERIALS PREPARATION

A. Carefully mix and prepare painting materials in accordance with manufacturer's directions.

B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.

C. Stir materials before application to produce a mixture of uniform density, and stir as required during application. Remove surface film and, if necessary, strain material before using.

D. Use only thinners approved by the paint manufacturer, and only within the recommended limits.

E. Tint each under coat a lighter shade to facilitate identification of each coat where multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.04 APPLICATION

A. General: Apply paint according to manufacturerôs written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes shall be as indicated or selected by the Owner/Architect.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term ñexposed surfacesò includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently

fixed equipment or furniture with prime coat only.

6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
10. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturerôs written instructions, sand between applications.
2. Omit primer on metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturerôs written instructions.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.
2. Rollers: Use rollers of carpet, velvet back, or high-pile sheepôs wool as recommended by the manufacturer for the material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturerôs recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in occupied spaces.

F. Masonry Fillers: Apply block fillers to concrete masonry units at a rate to ensure complete coverage with pores filled.

G. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

I. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.05 CLEAN-UP AND PROTECTION

A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

1. Upon completion of painting work, clean paint-spattered surfaces. Remove spattered paint by proper methods, with care not to scratch or otherwise damage finished surfaces.

B. Protection: Protect work of other trades against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

1. Provide "Wet Paint" signs to protect newly-painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.

2. At completion of work of other trades, touch-up and restore all damaged or defaced surfaces.

3.06 FIELD QUALITY CONTROL

A. The Owner reserves the right to invoke following test procedures at any time and as often as the Owner deems necessary during the period when paint is being applied:

1. The Owner will engage the services of an independent testing laboratory to sample the paint material being used. Samples of material delivered to the project will be taken, identified, sealed, and certified in the presence of the Contractor.

2. The testing laboratory will perform appropriate tests for the following characteristics as required by the Owner.

    a. Quantitative material analysis.
    b. Abrasion resistance.
    c. Apparent reflectivity.
    d. Flexibility.
    e. Washability.
    f. Absorption
    g. Accelerated weathering.
    h. Dry opacity.
    i. Accelerated yellowness.
    j. Recoating.
    k. Skinning.
    l. Color retention
    m. Alkali and mildew resistance

3. If the tests show material being used does not comply with the specified requirements, the Contractor may be directed to stop painting, remove non-complying paint, pay for testing, repaint surfaces coated with rejected paint, and remove rejected paint from previously painted surfaces if upon repainting with specified paint, the two coatings are non-compatible.

3.06 EXTERIOR PAINT SCHEDULE

A. General: Provide the following exterior paint systems as indicated on the Finish Schedules.

B. Metal: (Ferrous, Galv. Ferrous and Non-ferrous Metals):

1. Primer: 1 coat (4.0 ï 7.0 mils DFT) PPGô ñPITT-GUARDò Direct-To-Rust Epoxy Mastic , 97-145 Series.
2. Finish: 2 coats (4.0 ï 6.0 mil DFT each coat) PPGô ñAQUAPONò High Build Semi-Gloss Polyamide Epoxy, 97-130 series.

3.07 INTERIOR PAINT SCHEDULE

A. General: Provide the following interior paint systems as indicated on the Drawings and Finish Schedules.

B. Cast-In-Place Concrete Walls:

1. Semi-gloss Finish/High Build Polyamide-Epoxy:

a. Primer: 1 coat (4.0 ï 7.0 mils DFT) PPGôs ñPITT-GUARDò, 97-145 Series.
b. Finish: 2 coats (4.0 ï 6.0 mil DFT each coat) PPGôs ñAQUAPONò High Build Semi-Gloss Polyamide Epoxy, 97-130 series.

C. Concrete Floors:

1. Semi-gloss Finish/High Build Polyamide-Epoxy:

a. Primer: 1 coat (4.0 ï 7.0 mils DFT) PPGôs ñPITT-GUARDò Direct-To-Rust Epoxy Mastic , 97-145 Series.
b. Finish: 2 coats (4.0 ï 6.0 mil DFT each coat) PPGôs ñAQUAPONò High Build Semi-Gloss Polyamide Epoxy, 97-130 series.

D. Concrete Masonry Units, Semi Gloss Finish:

1. Semi-gloss Finish/High Build Polyamide-Epoxy:

a. Primer: 1 coat (4.0 ï 7.0 mils DFT) PPGôs ñAQUAPONò Polyamide-Epoxy Block Filler, 97-685 Series.
b. Finish: 2 coats (4.0 ï 6.0 mil DFT each coat) PPGôs ñAQUAPONò High Build Semi-Gloss Polyamide Epoxy, 97-130 series.

E. Gypsum Drywall; Wall and Ceiling locations indicated:

1. Semi-gloss Finish/High Build Polyamide-Epoxy:

a. Primer: 1 coat (4.0 ï 7.0 mils DFT) PPGôs ñPITT-GUARDò Direct-To-Rust Epoxy Mastic , 97-145 Series.
b. Finish: 2 coats (4.0 ï 6.0 mil DFT each coat) PPGôs ñAQUAPONò High Build Semi-Gloss Polyamide Epoxy, 97-130 series.

G. Metal, Ferrous, Galv., Piping, Ductwork, HVAC:

1. Semi-gloss Finish/High Build Polyamide-Epoxy:

a. Primer: 1 coat (4.0 ï 7.0 mils DFT) PPGôs ñPITT-GUARDò Direct-To-Rust Epoxy Mastic , 97-145 Series.
b. Finish: 2 coats (4.0 ï 6.0 mil DFT each coat) PPGôs ñAQUAPONò High Build Semi-Gloss Polyamide Epoxy, 97-130 series.

H. Zinc-coated Metal:

1. Semi-gloss Finish/High Build Polyamide-Epoxy:

a. Primer: 1 coat (4.0 ï 7.0 mils DFT) PPGôs ñPITT-GUARDò Direct-To-Rust

Epoxy Mastic , 97-145 Series.

b. Finish: 2 coats (4.0 ï 6.0 mil DFT each coat) PPGô s ñAQUAPONò High Build Semi-Gloss Polyamide Epoxy, 97-130 series.

END OF SECTION 09900

SECTION 10101
VISUAL DISPLAY SURFACES

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. Markerboards.
2. Tackboards.

1.3 DEFINITIONS

A. Tackboard: Framed or unframed tackable surface.

B. Visual Display Boards: Markerboards and tackboards.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Include motor capacities and individual panel weights for sliding visual display units.
2. Include computer system requirements for electronic markerboards.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Show location of panel joints.
2. Show location of special-purpose graphics for visual display surfaces.
3. Include sections of typical trim members.
4. Include wiring diagrams for motor-operated, sliding visual display units.

C. Samples for Initial Selection: For each type of visual display surface indicated and as follows:

1. Actual sections of porcelain-enamel face sheet.
2. Fabric swatches of vinyl-fabric-faced tack assemblies.
3. Samples of accessories involving color selection.

D. Samples for Verification: For each type of visual display surface indicated and as follows:

1. Visual Display Surface: Not less than 8-1/2 by 11 inches (215 by 280 mm), mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch- (152-mm-) long sections of each trim profile.
3. Rail Support System: 6-inch- (152-mm-) long sections.
4. Accessories: Full-size Sample of each type of accessory.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for surface-burning characteristics of vinyl fabrics.

F. Qualification Data: For Installer.

G. Maintenance Data: For visual display surfaces to include in maintenance manuals.

H. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative of motor-operated, sliding visual display unit manufacturer for installation and maintenance of units required for this Project.

B. Source Limitations: Obtain each type of visual display surface through one source from a single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of visual display surfaces and are based on the specific system indicated. Refer to Division 1 Section "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Fire-Test-Response Characteristics: Provide fabrics with the surface-burning characteristics indicated, as determined by testing identical products per ASTM E 84 by UL or another testing and inspecting agency acceptable to authorities having

jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-built visual display boards including factory-applied trim where indicated, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site.

B. Store visual display units vertically with packing materials between each unit.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating visual display surfaces without field measurements. Coordinate wall construction to ensure that actual dimensions correspond to established dimensions.
2. Allow for trimming and fitting where taking field measurements before fabrication might delay the Work.

1.8 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Surfaces lose original writing and erasing qualities.
b. Surfaces become slick or shiny.
c. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: 50 years from date of Substantial Completion.
3. Warranty Period: Life of the building.

B. Special Warranty for Electronic Markerboards: Manufacturer's standard form in which manufacturer agrees to repair or replace electronic markerboards that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Product: Subject to compliance with requirements, provide product specified.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 MATERIALS, GENERAL

A. Porcelain-Enamel Face Sheet: ASTM A 424, enameling-grade steel, uncoated thickness indicated; with exposed face and edges coated with primer, 1.7-to-2.5-mil- (0.043-to-0.064-mm-) thick ground coat, and color cover coat; and concealed face coated with primer and 1.7-to-2.5-mil- (0.043-to-0.064-mm-) thick ground coat.

1. Gloss-Finish Cover Coat: Gloss as indicated; dry-erase markers wipe clean with dry cloth or standard eraser. Minimum 3.0-to-4.0-mil- (0.076-to-0.102-mm-) thick cover coat. Cover and ground coats shall be fused to steel at manufacturer's standard firing temperatures but not less than 1475 deg F (802 deg C).

a. Product: PolyVision Corporation; P^3 ceramicsteel Markerboard.

B. Hardboard: AHA A135.4, tempered.

C. Particleboard: ANSI A208.1, Grade 1-M-1, made with binder containing no urea formaldehyde.

D. Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.

E. Cork Sheet: MS MIL-C-15116-C, Type II.

F. Natural Cork Sheet: Seamless, single layer, compressed fine-grain cork sheet, bulletin board quality; face sanded for natural finish.

G. Plastic-Impregnated Cork Sheet: MS MIL-C-15116-C, Type I, seamless, homogeneous, self-sealing sheet consisting of granulated cork, linseed oil, resin binders, and dry pigments that are mixed and calendared onto burlap backing; with washable vinyl finish and integral color throughout.

H. Vinyl Fabric: FS CCC-W-408, Type II, burlap weave; weighing not less than 13 oz./sq. yd. (440 g/sq. m); with flame-spread index of 25 or less when tested according to ASTM E 84.

I. Polyester Fabric: Nondirectional weave, 100 percent polyester; weighing not less than 15 oz./sq. yd. (508 g/sq. m); with flame-spread index of 25 or less when tested according to ASTM E 84.

J. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6063.

K. High-Pressure Plastic Laminate: NEMA LD 3.

2.3 MARKERBOARD ASSEMBLIES

A. Porcelain-Enamel Markerboard Assembly: Balanced, high-pressure, factory-laminated markerboard assembly of 3-ply construction consisting of backing sheet, core material, and 0.021-inch- (0.53-mm-) thick, porcelain-enamel face sheet with high gloss finish.

1. Manufacturers:
   a. Claridge Products & Equipment, Inc.
   b. Egan Visual Inc.
   c. Platinum Visual Systems; a division of ABC School Equipment, Inc.
   d. PolyVision Corporation.

B. Markerboard Sheet Assembly: Fabricated from 0.0209-inch- (0.55-mm-) thick, porcelain-enamel face sheets for direct application to wall surface.

2.4 TACK ASSEMBLIES

A. Manufacturers:
   1. Claridge Products & Equipment, Inc.
   2. Egan Visual Inc.
   3. Platinum Visual Systems; a division of ABC School Equipment, Inc.
   4. PolyVision Corporation.

B. Vinyl-Fabric-Faced Tack Assembly 1/16-inch- (1.6-mm-) thick, vinyl-fabric-faced cork sheet factory laminated to 3/8-inch- (9.5-mm-) thick fiberboard backing.

2.5 MARKERBOARD AND TACKBOARD ACCESSORIES

A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- (1.57-mm-) thick, extruded aluminum; of size and shape indicated.

   1. Factory-Applied Trim: Manufacturer's standard.

B. Chalktray: Manufacturer's standard, continuous.

   1. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
   2. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.

2.6 FABRICATION

A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.

B. Visual Display Boards: Factory assemble visual display boards, unless otherwise indicated.

   1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display boards at manufacturer's factory before shipment.

C. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.

   1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, as indicated on approved Shop Drawings.

2. Provide manufacturer's standard vertical-joint H-trim system between abutting sections of markerboards.
3. Provide manufacturer's standard mullion trim at joints between markerboards and tackboards of combination units.
4. Where size of visual display boards or other conditions require support in addition to normal trim, provide structural supports or modify trim as indicated or as selected by Architect from manufacturer's standard structural support accessories to suit conditions indicated.

D. Modular Visual Display Boards: Fabricated with integral panel clips attached to core material.

E. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to neat, hairline closure.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.

2.7 ALUMINUM FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

D. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

E. Class II, Color Anodic Finish: AA-M12C22A32/A34 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, integrally colored or electrolytically deposited color coating 0.010 mm or thicker) complying with AAMA 611.

F. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.

1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils (0.04 mm), medium gloss.

G. Powder-Coat Finish: Apply manufacturer's standard baked finish, complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motor-operated, sliding visual display units.

C. Examine walls and partitions for proper backing for visual display surfaces.

D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove dirt, scaling paint, projections, and depressions that will affect smooth, finished surfaces of visual display boards.

B. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, and substances that will impair bond between visual display boards and surfaces.

1. Seal wall surfaces indicated to receive visual display fabric.

C. Prepare recesses for sliding visual display units as required by type and size of unit.

3.3 INSTALLATION, GENERAL

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY UNITS

A. Visual Display Boards: Attach visual display boards to wall surfaces with egg-size adhesive gobs at 16 inches (400 mm) o.c. horizontally and vertically.

B. Visual Display Boards: Attach concealed clips, hangers, and grounds to wall surfaces and to visual display boards with fasteners at not more than 16 inches (400 mm) o.c. Secure both top and bottom of boards to walls.

3.5 INSTALLATION OF VISUAL DISPLAY FABRIC

A. Install visual display fabric according to requirements specified in Division 9 Section "Wall Coverings."

B. Install seams horizontal and level, with lowest seam [24 inches (610 mm above finished floor. Railroad fabric (reverse roll direction) to ensure color matching.

C. Double cut seams, with no gaps or overlaps. Remove air bubbles, wrinkles, blisters, and other defects.

D. After installation, wash visual display fabric according to manufacturer's written instructions. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.

3.6 CLEANING AND PROTECTION

A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display surfaces after installation and cleaning.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated, sliding visual display units.

END OF SECTION 10101

SECTION 15050

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Piping materials and installation instructions common to most piping systems.
   2. Transition fittings.
   3. Dielectric fittings.
   4. Mechanical sleeve seals.
   5. Sleeves.
   6. Escutcheons.
   7. Grout.
   8. Mechanical demolition.
   9. Equipment installation requirements common to equipment sections.
   10. Painting and finishing.
   11. Concrete bases.
   12. Supports and anchorages.

1.03 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
1. ABS: Acrylonitrile-butadiene-styrene plastic.
2. CPVC: Chlorinated polyvinyl chloride plastic.
3. PE: Polyethylene plastic.
4. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.04 SUBMITTALS

A. Product Data: For the following:
1. Transition fittings.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Escutcheons.

B. Welding certificates.

1.05 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Mechanical Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.07 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for mechanical installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.02 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 15 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.03 JOINING MATERIALS

A. Refer to individual Division 15 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
   1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
      a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
      b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
   2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.04 DIELECTRIC FITTINGS

A. Description: Combination fitting of copper alloy and ferrous materials with threaded, solder-joint, plain, or weld-neck end connections that match piping system materials.

B. Insulating Material: Suitable for system fluid, pressure, and temperature.

C. Dielectric Unions: Factory-fabricated, union assembly, for 250-psig minimum working pressure at 180 deg F.
   1. Manufacturers:
      a. Capitol Manufacturing Co.
      b. Central Plastics Company.
      c. Eclipse, Inc.
      d. Epco Sales, Inc.
      e. Hart Industries, International, Inc.
      f. Watts Industries, Inc.; Water Products Div.
      g. Zurn Industries, Inc.; Wilkins Div.

D. Dielectric Flanges: Factory-fabricated, companion-flange assembly, for 150- or 300-psig minimum working pressure as required to suit system pressures.
   1. Manufacturers:
      a. Capitol Manufacturing Co.

b. Central Plastics Company.
c. Epco Sales, Inc.
d. Watts Industries, Inc.; Water Products Div.

E. Dielectric-Flange Kits: Companion-flange assembly for field assembly. Include flanges, full-face- or ring-type neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
1. Manufacturers:
a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Central Plastics Company.
d. Pipeline Seal and Insulator, Inc.
2. Separate companion flanges and steel bolts and nuts shall have 150- or 300-psig minimum working pressure where required to suit system pressures.

F. Dielectric Couplings: Galvanized-steel coupling with inert and noncorrosive, thermoplastic lining; threaded ends; and 300-psig minimum working pressure at 225 deg F.
1. Manufacturers:
a. Calpico, Inc.
b. Lochinvar Corp.

G. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig minimum working pressure at 225 deg F .
1. Manufacturers:
a. Perfection Corp.
b. Precision Plumbing Products, Inc.
c. Sioux Chief Manufacturing Co., Inc.
d. Victaulic Co. of America.

2.05 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
1. Manufacturers:
a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.
2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.06 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
   1. Underdeck Clamp: Clamping ring with set screws.

2.07 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.
   1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
   1. Finish: Polished chrome-plated.

E. One-Piece, Stamped-Steel Type: With [set screw] [spring clips] [set screw or spring clips] and chrome-plated finish.

F. Split-Plate, Stamped-Steel Type: With exposed-rivet hinge, set screw or spring clips, and chrome-plated finish.

G. One-Piece, Floor-Plate Type: Cast-iron floor plate.

H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.08 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
   1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
   2. Design Mix: 5000-psi, 28-day compressive strength.

3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.01 MECHANICAL DEMOLITION

A. Refer to Division 1 Sections "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.
   1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
   2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
   3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
   4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
   5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
   6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
   7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.02 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
   1. New Piping:
      a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
      b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
      c. Insulated Piping: One-piece, stamped-steel type with spring clips.
      d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
      e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
      f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
      g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type and set screw.
      h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
      i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with exposed-rivet hinge and set screw or spring clips.
      j. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
      k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw.
      l. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Sleeves are not required for core-drilled holes.

N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
   1. Cut sleeves to length for mounting flush with both surfaces.
      a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
   2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
   3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
      a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
      b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
      c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 7 Section "Sheet Metal Flashing and Trim" for flashing.
         1) Seal space outside of sleeve fittings with grout.
   4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.

P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
   1. Install steel pipe for sleeves smaller than 6 inches in diameter.
   2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
   3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

Q. Verify final equipment locations for roughing-in.

R. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.03 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 15 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
   1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.04 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:
   1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
   2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
   3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
   4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.05 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.06 PAINTING

A. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.07 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 5 Section "Structural Steel" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.08 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

END OF SECTION

SECTION 15060
HANGERS AND SUPPORTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following hangers and supports for mechanical system piping and equipment:

1. Steel pipe hangers and supports.
2. Metal framing systems.
3. Thermal-hanger shield inserts.
4. Fastener systems.
5. Pipe stands.
6. Pipe positioning systems.
7. Equipment supports.

B. Related Sections include the following:
1. Division 15 Section "Mechanical Vibration and Seismic Controls" for vibration isolation devices.
2. Division 15 Section "Pipe Expansion Fittings and Loops" for pipe guides and anchors.

1.03 DEFINITIONS

A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.04 PERFORMANCE REQUIREMENTS

A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.05 SUBMITTALS

A. Product Data: For the following:

1. Steel pipe hangers and supports.
2. Fiberglass pipe hangers.
3. Thermal-hanger shield inserts.
4. Powder-actuated fastener systems.
5. Pipe positioning systems.

1.06 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
5. ASME Boiler and Pressure Vessel Code: Section IX.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.02 STEEL PIPE HANGERS AND SUPPORTS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Manufacturers:

1. Empire Industries, Inc.
2. Grinnell Corp.
3. National Pipe Hanger Corporation.
4. Tolco Inc.

C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.03 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:

1. ERICO/Michigan Hanger Co.; ERISTRUT Div.
2. Power-Strut Div.; Tyco International, Ltd.
3. Tolco Inc.
4. Unistrut Corp.; Tyco International, Ltd.

C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.04 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.

B. Manufacturers:

1. Carpenter & Paterson, Inc.
2. ERICO/Michigan Hanger Co.
3. PHS Industries, Inc.
4. Pipe Shields, Inc.
5. Rilco Manufacturing Company, Inc.
6. Value Engineered Products, Inc.

C. Insulation-Insert Material for Cold Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass with vapor barrier.

D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.

E. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

F. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

G. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.05 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

a. Hilti, Inc.
b. ITW Ramset/Red Head.
c. Masterset Fastening Systems, Inc.
d. MKT Fastening, LLC.
e. Powers Fasteners.

B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

1. Manufacturers:

a. B-Line Systems, Inc.; a division of Cooper Industries.
b. Empire Industries, Inc.
c. Hilti, Inc.
d. ITW Ramset/Red Head.
e. MKT Fastening, LLC.
f. Powers Fasteners.

2.06 PIPE STAND FABRICATION

A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping.

2.07 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, system of metal brackets, clips, and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.

B. Manufacturers:

1. C & S Mfg. Corp.
2. HOLDRITE Corp.; Hubbard Enterprises.
3. Samco Stamping, Inc.

2.08 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.09 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.01 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use padded hangers for piping that is subject to scratching.

F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30.
2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
6. Adjustable Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
8. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
9. Adjustable Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.
12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
16. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.

20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.

10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:

    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.

13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.

8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:

    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

O. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

3.02 HANGER AND SUPPORT INSTALLATION

A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Pipe Stand Installation:

1. Curb-Mounting-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. Refer to Division 7 Section "Roof Accessories" for curbs.

G. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 15 Section "Plumbing Fixtures" for plumbing fixtures.

H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

I. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

J. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

K. Install lateral bracing with pipe hangers and supports to prevent swaying.

L. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

M. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

N. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.

O. Insulated Piping: Comply with the following:

1. Attach clamps and spacers to piping.

a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
c. Do not exceed pipe stress limits according to ASME B31.1 for power piping and ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.

a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

4. Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
b. NPS 4: 12 inches long and 0.06 inch thick.
c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.

5. Pipes NPS 8 and Larger: Include wood inserts.
6. Insert Material: Length at least as long as protective shield.
7. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.03 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make smooth bearing surface.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.04 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and 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 welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.05 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.06 PAINTING

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 16010
GENERAL REQUIREMENTS

PART 1 GENERAL

1.01. REFERENCES.

A. The General Conditions are incorporated herein, are by this reference a part of these Specifications.

1.02 DEFINITIONS

A. Wherever the words "the Contractor", "this Contractor" or "Electrical Contractor", appear in this Section, they refer to the Contractor for Electrical Work.

B. The term "Work" includes such labor, methods, materials, equipment and transportation or other facilities required to complete the Contract, and the performance of all duties thereby upon the Contractor.

C. The terms "approved", "as approved", "satisfactory", "as directed" or other similar terms shall refer to the approval, satisfaction, direction, opinion, etc., of the Architect/Engineer unless specifically stated otherwise.

1.03 WORK INCLUDED

A. The work to be performed under this Section shall include all labor, materials, equipment, transportation, construction plant, and facilities necessary to provide a complete and satisfactory system ready to use.

B. The Contractor shall examine all drawings and all Sections and Divisions of the Specifications and shall be responsible and ascertaining to what extent other Drawings and Sections affect the Work herein specified.

C. The Work shall include, but is not only limited to, the following major items:

1. Electrical service to building including all charges by Power Company.

2. Secondary distribution system including main distribution panel, panelboards, feeders and branch circuit conduit and wiring.

3. Grounding.

4. Lighting fixtures.

5. Wiring devices.

6. Telephone and data outlets, conduits and coverplates.

D. Work Not Included.

1. Some of the major items which will be furnished by other contractors are:

a. Motor control wiring as herinafter specified.

2. Work to be done by other contractors will include furnishing and installing:

a. All conduit and wiring required for control work for air handlers, etc.

b. All associated automatic controls.

c. All telephone equipment and wiring shall be furnished and installed by the telephone utility.

d. Installation of computer data cabling, jacks and specialty coverplates. This contractor shall provide blank plates for all data outlets prior to data work.

E. Apparatus, appliances, materials, or work not shown on the Drawings but mentioned in the Specifications, or vice versa, or incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered and installed by the Contractor.

F. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the Contractor's bid, the same as if herein specified or shown.

G. The Electrical Contractors shall give written notice to the Architect/Engineer of materials or aparatus believed inadequate or unsuitable, in violation of laws, rules and necesssary items of work omitted. In the absence of such written notice, it is mutually agreed that

the Contractor has included the cost of all required items in his Bid.

1.04 CODES AND STANDARDS

A. The Work shall conform to the rules and regulations of the latest edition of the National Electrical Code including all subsequently published amendments thereto. The Work shall also conform to the requirements of all state and federal bureaus or departments which have authority over this project and the Contractor shall include all items of labor and material required to meet such requirements regardless of the failure to mention in the Specifications or show on the Drawings each individual item.

B. All equipment, apparatus and systems shall be rated, tested, fabricated, and/or installed in accordance with the applicable industry standard. The following list will serve to clarify abbreviations that may appear in other Sections of the Specification:

1. NEC National Electrical Code
2. NEMA National Electrical Manufacturer's Association
3. UL Underwriter's Laboratories, Inc.
4. ANSI American National Standards Institute
5. IPCEA Insulated Power Cable Engineers Association
6. NFPA National Fire Protection Association
7. IEEE Institute of Electrical and Electronic Engineers

1.05 PERMITS

A. The Contractor shall obtain all necessary permits and pay all inspection and installation fees required to construct the system.

1.06 INSTRUCTIONS

A. The layout shown on the Drawings is necessarily diagrammatic, but shall be followed as closely as other work will permit. Changes from these Drawings required to make this work conform to the building construction and design intent shall be made by the Contractor without additional cost to the Owner, but only with the approval of the Architect/Engineer. All such proposed changes shall be shown on Shop Drawings, to be submitted

before the changes are made. All measurements must be verified by actual observation and the Contractor shall be responsible for all his Work fitting in place in a satisfactory manner, to the approval of the Architect.

B. All materials and equipment shall be new and the best of their respective kinds and all Work shall be executed with the maximum speed consistent with good workmanship. The Contractor will be expected to furnish materials and equipment promptly after award of contract, and shall proceed with his Work in progress with the other contractors on the Project. He shall further agree to perform all work included in his contract in a manner that will not cause interferences or delays to, or interfere with, the progress of other trades.

C. The Contractor shall confer with the other Contractors regarding the location and size of pipes, equipment, ducts, openings, special architectural treatments, etc. in order that there may be no interferences between the installation or the progress of the Work of any contractor on the Project.

D. Contractor shall lay out the work and shall be responsible for its correctness. He shall correct at his own expense all errors in the work arising from his inaccuracy.

E. Upon completion of the Work, the Contractor shall provide the Owner with hardbound operating and service manuals for all equipment furnished and installed under this Division. All manuals shall be submitted to the Architect for review and approval.

1.07 IDENTIFICATION

A. The Contractor shall furnish and install proper identification in accordance with NEC-84, OSHA and the following requirements:

1. Panelboards.

a. Panelboards with doors shall be furnished with a typed card directory for each panel. Directory shall designate breaker number and load served. Panel shall also have all breakers individually numbered and panel shall have an inteior nameplate provided by manufacturer with voltage, amperage, phase, hertz, etc., listed. Contractor shall also provide an exterior engraved plastic signage with the panel name or letter designation.

b. Panelboards without doors shall have each protective device equipped with glazed frame containing a typed card designating load served and fuse size and type, if required.

2. Conductors.

a. Each feeder shall be identified at panels, pullboxes, and other access points with pressure labels indicating feeder number and switchboard or distribution panel from which the feeder originates.

3. Pullboxes.

a. Provide permanent marking on pullbox covers. Covers shall have words "ELECTRICAL P.B." stenciled on them with at least 1/2" high block type letters.

4. Starters and Disconnect Switches.

a. Shall be labeled with the following information:

(1) Equipment served

(2) Panel and circuit number

b. Labels shall be 3-ply laminated plastic with 1/4" high letters cut through top layer to expose center lamination.

1.08 SHOP DRAWINGS AND SUBMITTALS

A. The Contractor shall submit for approval detailed shop drawings of all equipment and all material required to complete the project, and no material or equipment be delivered to the job site or installed until the Contractor has in his possession the approved shop drawings for the particular material or equipment. The shop drawings shall be complete as described herein. The Contractor shall furnish the number of copies required by the General and Special Conditions of the Contract, but in no case less than six (6) copies.

B. Prior to delivery of any material to the job site, and sufficiently in advance of requirements to allow A/E ample time for checking, submit for approval detailed, dimensioned drawings or cuts, showing construction, size, arrangement, operating clearances, performance characteristics and capacity. Each item of equipment proposed shall be a standard catalog

product of an established manufacturer and of equal quality, finish and durability to that specified.

C. Samples, drawings, specifications and catalogs submitted for approval shall be properly labeled indicating specific service for which material or equipment is to be used, section and article number of Specifications governing, Contractor's name and name of job.

D. Catalogs, pamphlets, or other documents submitted to describe items on which approval is being requested shall be specific and identification in catalog, pamphlet, etc. of item submitted shall be clearly made in ink. Data of a general nature will not be accepted.

E. Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the Contract Drawings and Specifications.

F. Failure of the Contractor to submit shop drawings in ample time for checking shall not entitle him to an extension of contract time, and no claim for extension by reason of such default will be allowed.

1.09 VERIFICATION OF DIMENSIONS

A. The exactness of dimensions given on any Drawing issued by the Architect/Engineer is not guaranteed by them. Contractor shall therefore satisfy himself as to the accuracy of all dimensions. In all cases of interconnection of the work with other work, he shall verify at the site or on shop drawings all dimensions relating to such other work. All errors due to Contractor's failure to so verify any such dimensions shall be promptly rectified by the Contractor.

1.10 OPENINGS IN CONSTRUCTION

A. Openings required in new construction for this work shall be provided by the General Contractor at the request of and in accordance with information furnished by the Electrical Contractor. Where work has been installed previously to such request, the Electrical Contractor shall be responsible for the necessary cutting.

1.11 PAINTING

A. Painting of all Work included under this contract will be done as specified in Painting. However, panel fronts and other electrical devices and equipment furnished and installed under this contract, shall have the normal manufacturer's standard baked enamel or lacquer finish.

1.12 METHOD OF WIRING

A. All above-grade branch circuits shall be installed in metallic conduits. Equipment and devices installed by this Contractor and not constructed with enclosures especially suited for mounting and enclosing all live parts, shall be installed in metal cabinets; furnished by this Contractor.

1.13 VISITING THE SITE

A. Contractor shall carefully examine the site of the work and the adjacent premises and shall conduct the necessary investigations to thoroughly acquaint himself with the facilities for delivering and handling his equipment and materials at the site. Furthermore, he shall make a thorough investigation of the potential interferences and difficulties he may encounter in the proper and complete execution of all work specified herein and/or shown or called for on the Drawings. No additional compensation will be considered for misunderstanding the conditions to be met.

1.14 CONFLICTS

A. In the event of conflicts or discrepancies between this specification and the Contract Drawings, the Drawings shall govern.

1.15 EXCAVATION AND BACKFILL

A. This Contractor shall do all excavating, pumping, and backfilling required for the installation of the Work as shown on the Drawings. Backfilling under pavements, sidewalks or other traffic areas shall be made with sand or gravel entirely up to subgrade.

B. All surplus earth and debris shall be removed from the premises as directed by the Architect.

C. All sand used for backfill shall be natural bank sand graded from fine to coarse, not lumpy or frozen, and free from slag, cinders, ashes, rubbish or other material which in the opinion of the Architect is objectionable or deleterious.

D. Extreme caution shall be used during all excavation work, so as to avoid damage to existing utilities. The Contractor shall verify location of these utilities with the Owner's Representative and the Architect before starting this work.

1.16 TESTING

A. After wires and cables are in place and connected to devices and equipment, the system shall be tested for short circuits, improper grounds, and other faults. If a fault condition is present, the trouble shall be rectified, and then retested.

B. All wiring devices and electrical apparatus furnished under this contract, if grounded or shorted on any integral "live" part, shall be removed and the trouble rectified by replacing all defective parts, materials, etc.

C. Voltage tests shall be made at each lighting and distribution panel. If potential is too high or too low, the condition shall be corrected.

D. All meters, instruments, cable connections, equipment or apparatus necessary for making all tests shall be furnished by this Contractor at his own expense.

E. This Contractor shall cooperate with the Contractors furnishing motor equipment in placing the equipment in service operation and instructing the Owner's operator regarding proper operation. All motors shall be tested under load with ammeter readings taken for each phase, and the RPM of motors recorded at the time. All motors shall be tested for correct direction of rotation. Run tests on all motors and verify that proper overload devices have been installed.

1.17 EXECUTION OF WORK AND CLEANUP

A. All work shall be executed with the maximum speed consistent with good workmanship. Upon completion of the contract, all remaining materials and rubbish resulting from his work shall be removed from the building and premises by the Contractor and the work areas shall be left clean.

B. Contractor shall at all times prevent the accumulation of debris in the construction area, buildings, premises of the Owner, and over driveways, streets, and sidewalks. Contractor shall remove weekly from the premises, driveways, street, and sidewalks all debris, spilled excavation material, etc., caused by the work, and shall maintain the driveways, streets and sidewalks in a broom clean condition. To eliminate fire hazards,

Contractor shall also remove all combustible materials from the site immediately upon becoming scrap.

C. Contractor shall remove from the site, unless otherwise mutually agreed upon, all his temporary structures, offices, racks, surplus materials, scaffolding, equipment, tools, and supplies immediately upon termination of their usefulness to the job.

D. In the event the Owner or his authorized representative determines that the Contractor is failing to fulfill satisfactorily any of the above requirements, the Owner or his representative shall give the contractor detailed written notice. If the Contractor fails to comply with said notice within twenty-four (24) after receipt of same, the Owner may perform or have such work performed by others, and the cost thereof shall be chargeable to the Contractor.

1.18 GUARANTEE

A. This Contractor shall guarantee all of his work including labor, material, and equipment for this Project for a period of one (1) year.

1.19 CONCRETE WORK

A. This contractor shall provide and install concrete pads for electrical equipment if indicated on the Drawings.

1.20 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Electrical contractor shall furnish to A/E before final acceptance of these installations, three bound copies of a complete set of operating and maintenance instructions for all electrical systems and equipment. These booklets shall include copies of all Shop Drawings as finally approved, wiring diagrams with all components shown and designations of equipment conforming to Drawings, complete operating instructions and procedures, replacement part lists, procurement procedures and recommended spare parts listed.

B. Manuals shall be submitted to A/E for approval.

C. Electrical Contractor shall provide specified information covering

complete systems operation such as follows:

1. Building lighting including emergency lights.

2. Security/Fire Alarm system.

3. Electrical panels and service equipment.

4. All other equipment which will require service.

D. The electrical contractor shall instruct the User's operating personnel in the operation and maintenance of all systems provided under this contract before final acceptance of project.

1.21 CORRECTED DRAWINGS

A. The Contractor shall, during the progress of the Work, record any and all changes or deviations from the original Drawings and layout of the Work and record critical dimensions of buried or concealed Work. At the Completion of the project shall deliver to the Owner two ink-on-blueline marked-up sets of "As-built" Drawings.

1.22 VERIFICATION OF EXISTING UNDERGROUND UTILITIES AND SERVICES:

A. It shall be this Contractor's responsibility to verify location, type and size of any existing underground conduit or service in any area where below grade work of any trade must be performed.

B. All work around existing underground service shall be coordinated with and approved by the Utility Company and the A/E.

END OF SECTION

SECTION 16111
CONDUITS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work includes:

1. Conduits.

2. Conduit fittings.

3. Supports and hangers.

B. Related work specified elsewhere:

1. 16130 - Outlet Boxes

1.02 STANDARDS

A. All conduit shall bear the U.L. label and be in accordance with U.L. Standards UL6 and UL797, ANSI C80.1-1966 (R1971) and C80.3-1966 (R1971).

B. Fittings shall be in accordance with ANSI C80.4-1963 (R1974).

PART 2 PRODUCTS

2.01. MANUFACTURERS

A. Metallic conduit shall be manufactured by Republic, Jones and Laughlin or Allied Tube and Conduit Corporation.

B. Flexible conduits shall be manufactured by Anaconda, Appleton or Triangle.

C. PVC conduit shall be manufactured by Carlon, Robintech or Triangle.

2.02. RIGID GALVANIZED STEEL CONDUIT (RGS)

A. Rigid galvanized steel conduit shall be mild steel, hot-sip galvanized.

B. Elbows, bends, and similar offsets shall be made of full weight materials complying with the above and shall be coated and threaded.

C. Threads for conduit, couplings, and fittings shall be full depth and clean cut.

D. Couplings, fittings, etc. shall be manufactured by Erickson, Midwest Electric, Crouse-Hinds or Thomas and Betts.

2.03. INTERMEDIATE METAL CONDUIT (IMC)

A. Intermediate metal conduit shall be hot-dip galvanized steel.

B. Elbows, bends, and similar offsets shall be made of full weight materials complying with the above and shall be coated and threaded the same as conduit.

C. Couplings, fittings, etc, shall be manufactured by Erickson, Midwest Electric, Crouse-Hinds or Thomas and Betts.

2.04. ELECTRICAL METALIC TUBING (EMT)

A. Electrical metallic tubing shall be galvanized zinc exterior with lacquer coated interior.

B. Elbows, bends, and similar offsets shall be made from full weight materials complying with the above and shall be coated the same as electrical metallic tubing.

C. EMT fittings shall be compression or set screw type, concrete tight, with galvanized pressure cat bodies and nuts. Connectors shall have insulated bushings as manufactured by Raco, Appleton or Steel City.

2.05. FLEXIBLE STEEL CONDUIT

A. Flexible steel conduit shall be standard weight, flexible, galvanized steel.

B. Use 3/8-inch with a 6 ft.-0 in. maximum length for recessed light fixtures. All other flexible conduit shall be 1/2-inch minimum trade size

unless otherwise noted.

C. Fittings shall be designed for use with flexible steel conduit and shall maintain electrical continuity throughout fittings and conduit.

2.06. LIQUIDTIGHT FLEXIBLE STEEL CONDUIT

A. Liquidtight flexible steel conduit shall be minimum 1/2-inch trade size, U.L. listed, standard weight, flexible, galvanized steel conduit with a heavy wall neoprene jacket.

B. Fittings shall be ferrule and sleeve type, designed for use with liquidtight flexible steel conduit and shall maintain electrical continiuty throughout fittings and conduit.

PART 3 EXECUTION

3.01. CONDUIT USAGE - GENERAL REQUIREMENTS.

A. All wiring shall be installed in a concealed conduit except where exposed conduit is noted on the drawings.

B. All conduit shall be sized according to the National Electrical Code. 3/4-inch minimum allowable size permitted except for switchlegs where permitted by code.

C. All conduit shall be run concealed unless otherwise shown. Exposed conduits shall be run parallel to and plumb with adjacent surfaces.

D. All conduit bends shall be long radius with no more than four 4) 90 degree bends or 100 feet between pulling points.

E. All open ends of conduits shall be temporarily plugged with Thomas & Betts plastic "push-penny plugs" to prevent entrance of foreign material during construction. Newspapers stuffed into boxes and/or conduits will not be allowed.

F. All conduits shall be rigidly supported to the building structure. No tie wiring will be allowed. (See paragraph entitled "Conduit Supports and Hangers".)

G. All conduit shall be cut square, reamed smooth, and drawn uptight to provide an electrically continuous raceway throughout.

H. Coordinate all conduit locations with other trades before roughing-in.

I. Provide three (3) one-inch conduits, from each flush mounted panelboard into the ceiling or joist space above the panel and cap dust-tight for future use.

3.02. RIGID GALVANIZED STEEL (RGS) AND INTERMEDIATE METAL CONDUITS (IMC)

A. Shall be used for all above-grade conduits larger than 1-1/4 inches and for all panelboard feeders.

B. Shall be installed at all exposed exterior locations and in poured concrete slabs and walls. One-inch minimum concrete covering shall be maintained in slabs.

C. Shall be equipped with insulating type bushings with double locknuts when used at all connections to panelboards, junction boxes, outlet boxes, wireways, etc.

D. Shall be reamed after cutting threads.

E. Shall be coupled with Erickson Couplings in lieu of "running threads".

3.03. ELECTRICAL METALLIC TUBING (EMT)

A. In general, shall be used for all interior work for conduits 1-1/4 inches and smaller trade size.

B. Shall butt solidly into fittings.

C. Shall be installed with insulating type bushings on all connectors where the wire size is #6 or larger.

3.04. PVC CONDUIT

A. Shall be used below interior slab for phone, data and power wiring.

3.05. FLEXIBLE CONDUITS

A. Flexible steel conduit shall be used in lengths up to six (6) feet for connection to recessed light fixtures and in cabinet falsework (such as used in laboratories) for connection to outlets from a rigid conduit system.

B. Liquidtight flexible steel conduit shall be used in lengths 18 to 36 inches for connections to motors or equipment subject to vibration. For all motor outlets a separate grounding conductor, sized per the N.E.C., shall be installed in flexible portion of the conduit.

C. Flexible conduit shall be liquid tight type for all exterior locations and motor connections.

3.05. SUPPORTS AND HANGERS

A. Single Suspended Conduits:

1. Exposed Construction.

a. For EMT, RGS, and IMC conduit 2-inches and smaller use Appleton "Hang-ON", Raco "Conduit Clamps", or Midland-Ross hangers. Anchor hangers with bolts or threaded rods to concrete inserts or to beam clamps attached to steel structure.

b. For RGS or IMC conduits larger than 2-inches, use heavy-duty type pipe hangers manufactured by Midland-Ross, Steel City, Appleton, Minerllac, or Thomas and Betts. Anchor hangers with bolts or threaded rods to steel structure.

2. Concealed Above Suspended Ceiling.

a. For EMT conduit 1-inch and smaller, conduit may be attached to the ceiling support wires using "clip-on" type fasteners manufactured by Elcen Metal Products, Minerallac, or Hilti Fastening Systems.

B. Multiple Suspended Conduits:

1. Provide trapeze type hanger assemblies with steel channels and threaded rods for two or more adjacent EMT, RGS, or IMC conduits. Steel channels shall be manufactured by Unistrut, Midland-Ross, Kurdorf, or B-Line Systems, Inc. Anchor conduits to channels with proper split pipe clamps.

2. Anchor trapeze hangers with threaded rods to concrete inserts or to beam clamps attached to steel structure.

C. Surface Mounted Conduits:

1. For EMT conduit and for RGS and IMC conduit less than 1-1/2 inch, use one-hole or two-hole galvanized stamped steel pipe straps manufactured by Appleton, Midland-Ross Steel City, Thomas and Betts or Raco.

2. For RGS and IMC conduits larger than 1-1/2 inch and for all exterior conduits use malleable iron pipe straps manufactured by Appleton, Midland-Ross Steel City, or Raco.

3. Anchor surface conduit straps or clamps as follows:

a. Expansion bolts on concrete or brick.

b. Toggle bolts on plaster walls or hollow masonry.

c. Wood screws on wood.

4. Bolts and anchors shall be manufactured by Ackerman-Johnson, Pain, or Starr. Screws for exposed work shall be Everdue, Monel, or Allegheny Metal.

D. Install specified conduit supports a minimum of every 10 feet for conduits larger than one-inch, every 8 feet for conduits 1-inch and smaller, and within 3 feet of outlet boxes, junction boxes, cabinets or fittings.

3.06. SLEEVES AND INSERTS

A. Furnish and install all inserts and/or anchors for the supporting of conduit and other electrical equipment, as specified hereinbefore.

B. Furnish and install all sleeves per the following requirements:

1. Provide sleeves for all conduits passing through exterior, smoke, fire or masonry walls, floors or ceilings.

2. Sleeves shall be heavy wall steel pipes, anchored to the building construction and finishing flush with line of the wall, floor or ceiling.

3. Sleeves and conduits passing thru fire and/or smoke rated construction shall be equipped with U.L. approved fittings, suitable for this type of application.

4. Sleeves and conduits passing thru below grade walls and slabs shall be equipped with watertight seals by O.Z., PLM, or Appleton.

5. All other sleeves shall be packed with oakum and jute between sleeve and conduit and grouted with cement.

6. All conduits with feeder cables, #3 AWG or larger, rising vertically for 30 feet or more, shall have cable supports.

7. All conduits passing through building expansion joints shall be provided with expansion and deflection fittings by O.Z., PLM, or Appleton. Maintain grounding integrity of conduit by jumper bond or thru fitting.

END OF SECTION

SECTION 16120
WIRES and CABLES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work includes:

1. Wire and cable.
2. Wire tags.
3. Cable lugs and taps.
4. Wire Connections.
5. Pulling cables.

B. Related work specified elsewhere:

1. 16111 - Conduits

1.02 STANDARDS

A. All cable and wire shall comply with the latest Specifications of IPCEA.

PART 2 PRODUCTS

2.01. WIRE AND CABLE - 600 VOLTS OR LESS.

A. The circular mill area and insulating walls for all wires and cables shall conform in thickness and size to latest requirements of the National Electrical Code for 600 volt operation. No wires smaller than No. 12 shall be installed unless specifically designated, except that motor control circuits shall be No. 14 unless otherwise indicated on the Drawings.

B. Conductors shall be soft drawn copper. Conductivity of wire shall be not less than 98%.

C. Types of insulation and use shall be as follows, unless specifically indicated otherwise on the Drawings.

1. Service entrance conductors, feeders, and circuits above 40 amperes:

THHN, THWN, or THHW.

2. Branch circuits including lighting, receptacle, controls and power circuits 40 amperes and below: THW, THHN, or THWN.

3. Fixture wiring and wiring in channels of continuous rows of fluorescent lighting fixtures: THHN, AF, or other 90 degrees C rated type.

4. Fixture wiring in recessed incandescent fixtures shall be SF-2, silicon insulated, glass braid jacket, 200 degrees C rated.

5. Conductors within five feet of boilers or one foot of heating pipes shall be 110 degrees C rated.

D. Conductors size No. 8 and larger shall be stranded; smaller than No. 8 shall be solid.

2.02 MANUFACTURERS

A. All wire and cable shall be manufactured be Anaconda, Rome, Triangle General Electric, or Crescent.

2.03 CABLE LUGS AND TAP

A. Lugs and taps for conductor sizes No. 8 or smaller: compression type and shall be Thomas and Betts "Stakon", Burndy "Hydent", or Buchanan "Pressure".

B. Lugs and taps for conductors larger than No. 8: compression type and shall be Thomas and Betts "Lugitt", Burndy "Quiklug", Penn union "Ez".

C. Connectors to all motors shall be compression indent type suitable for feeder and motor conductors.

2.04 WIRE CONNECTORS

A. Connectors used to connect fixtures to circuits shall be screw-on spring type connectors with flexible plastic jacket and shall be manufactured by 3M, Ideal, or Thomas and Betts.

2.05 PULLING CABLES

A. Pulling cables for steel conduit shall be nylon or steel.

2.06 LUBRICANT

A. Lubricant for pulling wires or conduit shall be U.L. listed. Grease or oil will not be permitted.

PART 3 EXECUTION

3.01 INSTALLATION OF WIRE AND CABLE, 600 VOLTS OR LESS

A. Install all wire and cable in metallic conduits.

B. Run all panel feeders in rigid galvanized steel.

C. No wire shall be pulled until conduit installation is complete.

D. Do not pull thermoplastic wire at temperatures lower than 33 degrees F.

E. Use pull-in lubricant to facilitate pulling of wire.

F. Splice and connect wires only in readily accessible boxes.

G. Outdoor conduit runs shall not be less than 24" below finished grade.

H. Branch circuits shall be installed to provide a maximum of 2 percent voltage drop.

3.02 SPLICING 600 VOLT WIRE

A. #8 and smaller:

1. Ideal "wing nut" type insulated connectors.

2. Scotchlok R, B and Y type insulated connectors.

3. Thomas and Betts, PT-1, PT-2 and PT-3 insulated connectors.

B. #6 and larger conductors shall be spliced with approved connectors manufactured by O.Z., Burndy, or PLM.

C. Use plastic tape on all uninsulated wire splices manufactured by Scotch, Okonite, or Grady Co.

3.03 WIRE AND CABLE IDENTIFICATION

A. Color code wire size No. 10 and smaller as follows:

120/208 V

1.	Phase A	Black
2.	Phase B	Red
3.	Neutral	White
4.	Ground	Green

B. Cables over size No. 10 shall have each phase labeled using around-the-wire labels at each access point.

C. Identify control wires at terminations with numbers shown on the Control Drawings.

D. Identify lighting branch circuits with around-the-wire markers designating circuit numbers.

E. Train and lace wiring inside equipment panelboard with plastic wrap for a neat appearance.

F. Make all spare wires in cabinets or panelboards of adequate length for connections. Terminate with insulating tape and tag.

G. Interlocks installed in one device with power from another device shall be special coding of yellow tracer on black wire.

3.04 WIRE CONNECTIONS AND DEVICES, 600 VOLTS AND LESS

A. Thoroughly clean wires before installing lugs and connectors so that joint will carry full capacity of conductors without perceptible temperature rise. Use lugs or connectors of sufficient size to enclose all strands of the conductors.

END OF SECTION

SECTION 16130
OUTLET BOXES

PART 1 GENERAL

1.01. DESCRIPTION.

A. Work includes:

1. Outlet boxes.

B. Related work specified elsewhere:

1. 16111 - Conduits.

1.02. STANDARDS.

A. All boxes shall be U.L. listed and shall meet all requirements of the National Electrical Code.

PART 2 PRODUCTS

2.01. GENERAL REQUIREMENTS.

A. All outlet boxes for concealed, interior work or exposed, interior work in dry locations shall be stamped, one-piece, galvanized steel.

B. Outlet boxes installed at all exterior locations and exposed interior wet or damp locations below 6'-0" shall be cast type with threaded hubs.

C. Stamped boxes shall be as manufactured by Appleton, Raco, or Steel City. Cast boxes shall be as manufactured by Appleton, Crouse-Hinds, or Kilark.

2.02. OUTLET BOXES FOR SUSPENDED OR SURFACE MOUNTED FIXTURES.

A. Boxes shall be four inch octagonal or square, as required, a minimum of 1-1/2 inches deep with fixture studs.

B. On suspended ceilings boxes shall be equipped with minimum depth plaster rings.

C. Stamped boxes shall be four inch octagonal or square for all exposed conduit work with fixture extension pan or deep fixture canopy to enclose the box.

D. Wire in pipe pendants shall be #14 stranded, type AF, 300 volts.

2.03. OUTLET BOXES FOR RECESSED FIXTURES.

A. Boxes shall be four inch octagonal or square, as required, a minimum of 1-1/2 inches deep, complete with blank cover.

B. Wire in Greenfield to be #12 type THHN, 600 volts.

2.04. SWITCH AND RECEPTACLE BOXES.

A. Boxes shall be four (4) inch square for up to two (2) devices and solid gang boxes for over two (2) devices.

B. Boxes shall be complete with 1-inch minimum depth tile ring where used in exposed tile, concrete block, or panel walls or with 1-inch minimum depth plaster ring where used in plastered walls.

C. Boxes for exposed conduit work shall be installed with 1/2 inch raised galvanized device covers.

2.05. FLOOR BOX.

A. Provide a floor box at locations noted on the plans which have separate compartments for power and data. The power side of the box should have openings for (2) duplex outlets. The data side should have a blank plate for installation of data outlets by others. The activation cover should be one-piece cast aluminum with carpet/tile flange and flush cable exit opening.

B. Approximate size of module is 12-3/4" x 10" wide by 3-7/16" deep. There shall be 16 conduit knockouts for up to 1-1/4" conduits.

C. Approved Manufacturer and Model.

a. Walker RAK-MII with RFB-4 cover. The Walker representative phone number is 800-678-3075.

PART 3 EXECUTION

3.01. GENERAL REQUIREMENTS.

A. All boxes shall be installed so that device and/or cover plates will be tight and plumb with wall finish.

B. All unused conduit openings shall be closed with Knock-Out closures.

C. All conduits entering boxes shall be properly protected to prevent foreign material from entering. The use of newspapers stuffed into boxes will not be allowed.

D. All exposed (surface mounted) boxes shall be secured to construction by means of toggle bolts or lead expansion anchors.

3.02. OUTLET BOXES FOR SUSPENDED OR SURFACE MOUNTED FIXTURES SHALL BE:

A. Supported from bar hangers or 1-1/2 inch lathers channel, attached to building construction, for suspended ceilings.

B. Installed with minimum depth plaster rings on suspended ceilings.

C. Installed above the ceiling with blank cover plate and final flexible conduit connection to fixture for fluorescent fixtures on exposed "T"-bar type accessible ceilings. Fixtures shall be supported to ceiling system independent of the outlet box.

3.03. OUTLET BOXES FOR RECESSED FIXTURES SHALL BE:

A. Installed above fixture opening.

B. Installed with Greenfield from fixture outlet box to fixture with length of Greenfield such that fixture may be dropped for servicing.

3.04. SWITCH AND RECEPTACLE BOXES SHALL BE:

A. Outlet boxes for wall switches shall be located 48 inches above finished floor to the bottom of the outlet box unless otherwise noted on the drawings.

B. Outlet boxes for receptacle and communication outlets shall be located 15 inches above finished floor to the bottom of the outlet box unless otherwise noted on the drawings.

END OF SECTION

SECTION 16140
WIRING DEVICES

PART 1 GENERAL

1.01 DESCRIPTION

A. Work includes:

1. Wiring devices.

2. Device covers.

B. Related work specified elsewhere:

1. 16111 - Conduits

2. 16130 - Outlet Boxes

1.02 STANDARDS

A. All devices shall be Underwriter's Laboratory listed and conform to the applicable N.E.M.A. Standards.

1.03 SUBMITTALS

A. Provide product data in accordance with General Conditions and Section 16010.

PART 2 PRODUCTS

2.01 SWITCHES AND RECEPTACLES

A. Devices shall be as listed and as shown on the Drawings. All devices listed in this Specification may not be applicable to this Project and the Contractor shall consult the Symbol List on the Drawings to determine which devices are required.

B. The devices listed below are based on Hubbell, Leviton, and Bryant catalog numbers to establish style and quality. Devices of equal grade as manufactured by Arrow Hart or Pass & Seymour may be considered equal.

C. Devices shall be as listed below:

Pass/Seymour

1. Single Pole Switch 2621-W (20A, 120/277V) Rocker style
2. Two Pole Switch 2622-W (20A, 120/277V)
3. Three-way Switch 2623-W (20A, 120/277V)
4. Four-way Switch 2624-W (20A, 120/277V)
5. Momentary Contact 1255 Switch (20A, 120/277V)
6. Single Pole Switch 2629-W with Pilot Light (20A, 120V)
7. Duplex Receptacle 26352-W (20A, 120V)
8. Weatherproof Duplex 2091-S-W w/Receptacle 1591-WP (20A, 120V)
9. Duplex Receptacle with 2091-S-W GFCI (20A, 120V)
10. Isolated Ground Receptacle IG26362 (20A, 120V)

D. Special purpose receptacle outlets or plugs shall be of the ampere rating and configuration as indicated on the Drawings.

2.02 COVERPLATES

A. Coverplates shall be white unless otherwise specified.

B. Provide covers with gang plates for multiple devices.

PART 3 EXECUTION

3.01. GENERAL REQUIREMENTS

A. The Contractor shall coordinate the location of all switches and receptacles with other trades on the Project in order to avoid interferences. The direction of all door swings shall be verified with the General Contractor at the job site.

3.02 LOCATION

A. Devices generally shall be as located on the Drawings. This Contractor shall coordinate the exact location of outlets with the General Contractor and the Owner and shall install the outlets so that they are properly spaced and located with relation to the interior and exterior finish and treatment.

3.03 MOUNTING HEIGHTS

A. Wall switches - 48" above floor.

B. Receptacles - bottom of outlet 15" above floor. Unless otherwise noted.

C. Telephone outlets - same as receptacles.

D. Manual starters - 4'-0" above floor.

E. Starter/Disconnect switches - 5'-0" above floor.

3.04 GROUNDING

A. All receptacles shall have a separate green insulated wire from the panel ground bus.

END OF SECTION

SECTION 16170
MOTOR and EQUIPMENT SAFETY DISCONNECTS

PART 1 GENERAL

1.01 DESCRIPTION

A. Work includes:

1. Motor and equipment safety disconnects.

B. Related work specified elsewhere:

1. 16180 - Overcurrent Safety Devices.

1.02 SUBMITTALS

A. Submit product data in accordance with General Conditions and Section 16010.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide disconnects for all motors and equipment as required by the NEC, whether or not indicated on the Drawings.

B. Disconnects shall be either safety switches or circuit breakers as specified herein.

C. Disconnects shall be for the highest voltage supplied to the equipment and shall disconnect all power to that equipment. For equipment requiring lower voltages, in general, transformers shall be provided and all such transformers deenergized by the equipment disconnect. Disconnects for equipment shall be provided with interlocks for disconnecting associated auxiliary or control circuits from equipment.

D. All disconnects shall be U.L. listed and shall be manufactured by Square D, General Electric, Cutler-Hammer, or Westinghouse.

2.02 SAFETY SWITCHES

A. Safety switches shall be heavy duty, horsepower rated. Switches shall be of the voltage, size, number of poles, and be fused or non-fused as indicated on the drawings or required.

B. Safety switches on load side of motor protection do not have to be fused, unless otherwise indicated on the Drawings. Fuses, where required, shall comply with Section 16180.

2.03 CIRCUIT BREAKER DISCONNECTS

A. Circuit breaker disconnects shall be rated for the voltage, size, and number of poles required and shall have adequate short circuit current withstand and interruption ratings for the application.

B. Breakers shall be thermal-magnetic with instantaneous and inverse long time overload trips.

2.04 ENCLOSURES

A. Except as otherwise indicated on the Drawings, enclosures for disconnects shall be as follows:

	Location	Enclosure
1.	Indoor	NEMA 1
2.	Outdoor	NEMA 3R

PART 3 EXECUTION

3.01 DISCONNECT INSTALLATION

A. Disconnects shall be readily accessible in accordance with NEC and shall not interfere with removal of equipment parts or with standard maintenance.

END OF SECTION

SECTION 16185
MECHANICAL EQUIPMENT and WIRING

PART 1 GENERAL

1.01. WORK INCLUDES

A. Base Bid

1. Electrical Contractor Provide:

a. Final connections and power wiring for mechanical equipment.

2. Electrical Contractor not responsible for:

a. Control Wiring.

1.02. RELATED WORK

A. Specified Elsewhere:

1. 16111 - Conduit.

2. 16120 - Wire and Cable.

3. 16155 - Motor Starters.

PART 2 PRODUCTS

2.01. GENERAL REQUIREMENTS

A. The Electrical Contractor shall provide all necessary material to complete final power wiring connections to all mechanical equipment items.

PART 3 EXECUTION

3.01. GENERAL REQUIREMENTS

A. Final connections to motorized equipment items shall be made in accordance with Sections 16111, 16120, and 16155. The Electrical Contractor shall furnish and install all motor starters and disconnect

switches as shown on the Drawings.

B. All integral packaged equipment panels shall be provided by the Contractor furnishing the equipment. Panels shall be installed and shall have all power wiring completed by the Electrical Contractor.

C. Electrical Contractor shall provide all necessary assistance during start-up and installation to the Contractors furnishing the various equipment.

D. Verify with Mechanical Contractor as to what electrical equipment is furnished with mechanical equipment. Starters shall be provided by Electrical Contractor unless otherwise noted as such on Drawings.

E. Electrical Contractor is responsible for start-up and testing of all motors.

F. The Contractor shall cooperate with the Mechanical Equipment Contractor in placing the various motors and equipment in operation. The proper phasing and motor rotation shall be verified.

G. Final connections to motors shall be made with liquid-tight flexible conduit. Conduit shall be a maximum of 36" in length.

END OF SECTION

SECTION 16450
GROUNDING

PART 1 GENERAL

1.01 WORK INCLUDES

A. Base Bid

1. Electrical Contractor Provide:

a. Equipment and enclosure grounding

1.02 QUALITY ASSURANCE

A. Grounding for the electrical installation and for all equipment in Divisions 15 and 16 shall conform to all requirements of Article 250 of the N.E.C.

B. All grounding equipment shall be U.L. approved.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Equipment grounding conductors shall be sized per the N.E.C.

2.02 MANUFACTURERS

A. All grounding clamps and devices shall be of approved types as manufactured by Thomas and Betts Co., O.Z., or Burndy.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Install a separate green wire grounding system in compliance with the NEC as indicated on the Drawings.

B. Resistance to ground at any point shall not measure more than 5.0 ohms.

C. In general, all conduits, raceways, equipment and enclosures, panel housings, fixture housings, etc., shall be grounded to the

service equipment location utilizing a separate insulated green ground conductor.

D. Branch circuits for motors and/or motorized equipment shall have an individual equipment grounding conductor attached to the panel ground bus at the other end.

E. Provide ground jumper with approved fitting across all flexible connections to motors.

3.02. FIELD QUALITY CONTROL

A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

B. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point using suitable ground testing equipment. Resistance shall not exceed 50 ohms.

END OF SECTION

SECTION 16740
EMPTY TELEPHONE/DATA CONDUIT

PART 1 GENERAL

1.01 DESCRIPTION

A. Work Includes:

1. Electrical Contractor to provide:

a. Empty conduit, and boxes for installation of new telephone/data system.

2. User to provide:

a. Telephone/Data equipment and wiring installation, including final connection of equipment to wiring.

B. Related work specified elsewhere:

1. 16010 - General Requirements.

2. 16130 - Outlet Boxes.

1.02 QUALITY ASSURANCE

A. Regulatory requirements:

1. Governing codes:

a. Latest edition of the National Electric Code.

PART 2 PRODUCTS

2.01. TELEPHONE/DATA OUTLETS

A. Walls: Individual wall telephone/data outlets shall consist of standard 4-inch square, 2-1/2" deep outlet boxes with appropriate box rings, stainless steel coverplate. Mounting height shall be the same as receptacles or as indicated on the drawings.

B. Floor: Outlets to be installed in floor boxes of type specified on the drawings.

PART 3 EXECUTION

3.01 TELEPHONE/DATA CONDUIT SYSTEM

A. Furnish and install a complete system of conduits, pullboxes and outlets as indicated on the drawings and herein specified.

B. Install conduits from outlets in location indicated on the drawings. Conduits shall be installed to above accessible ceiling and terminate with 90 degree elbow and bushing or as noted on the drawings.

C. All telephone/data conduits shall be concealed and all boxes flush mounted.

D. Mount telephone/data outlets at 15-inch centerline for general outlets or as noted on the drawings.

3.02 CONDUIT SIZING

A. All conduit sizes shall be verified for proper size before rough-in.

END OF SECTION