State Project No. 155-0240 EA
William H. Hall High School
West Hartford, Connecticut

WILLIAM H. HALL HIGH SCHOOL
SCIENCE CLASSROOM PROJECT
975 NORTH MAIN STREET
West Hartford, Connecticut

ADDENDUM NO. 4

FUSCO CONSTRUCTION

FUSCO PROJECT #2770
March 23, 2018

ADDENDUM NO. 4

March 23, 2018

WILLIAM H. HALL HIGH SCHOOL
SCIENCE CLASSROOM PROJECT
975 NORTH MAIN STREET
West Hartford, Connecticut
State Project No. 155-0240 EA

ALL BIDS DUE – Tuesday, APRIL 3, 2018 before 1:00PM

RFI's must be submitted at **least Eight (8) days** prior to the Bid Opening Date. **March 26, 2018** at **12 NOON** will be the **final day** for submitting all RFIs. Any RFI received after that date will not be answered.

The last **ADDENDA**, if required, will be issued in writing **no later than Five (5) days** prior to the Bid Opening Date. **March 29, 2018** will be the final day for issuing Addenda.

De-Scope Meetings-After the Bids have been reviewed for conformance with the bid documents, the apparent low bidder for each bid package shall be available for a Scope Review at the office of the Fusco Corporation, 555 Long Wharf Drive, Suite 14, New Haven, CT. on the following dates:

Thursday, April 5, 2018	**Bid Package #12.0**	**8:30 A.M.**
	Bid Package #02.0	**10:30 A.M.**
	Bid Package #31.0	**1:00 P.M.**
	Bid Package #08.1	**3:00 P.M.**
Friday, April 6, 2018	**Bid Package #22.0**	**8:30 A.M.**
	Bid Package #23.0	**10:30 A.M.**
	Bid Package #26.0	**1:00 P.M.**
	Bid Package #09.0	**3:00 P.M.**

In attendance shall be a Principal of the Firm, all parties that worked on assembling the Bid, the proposed Project Manager, and proposed Project Superintendent and proposed Project Foreman.

This document consists of eight (8) pages plus the following documents:

1) Fusco Responses to Pre-Bid Requests for Information (RFI's) #9R, #49 through #67
2) JCJ Architecture-Addendum #4 Dated March 23, 2018 80 Pages
3) Specification Document 000950 Bid Forms A B C D E F 16 Pages

BIDDERS REQUEST FOR INFORMATION #9R and #49 THROUGH #67

RFI #9R

Q. BP. 8.0-Reference is made to Drawing A-560 details 3, 9 and 10.
EFCO the basis of design Manufacturer says that they cannot provide the snap trim that is detailed on the drawings.

A. Snap Trims should match window frames for material and finish. Manufacturer's recommended attachment should be provided for a snap trim fin. Corner intersection should be butt joint, with top overlapping the side. (BP 08.0-Please note that this work shall be Bid as an Alternate-See the Revised Bid Form that is part of this Addendum.)

RFI #49

Q.-BP 07.0-What are the thru-wall scuppers and downspouts to be fabricated out of? Freedom Gray Copper or Aluminum? Sheet Metal Specification 076200 does not indicate which material.

A. Refer to Revised Specification Section 076200-Sheet Metal Flashing and Trim that is part of Addendum #4.

RFI #50

Q. BP's 21.0; 22.0; 23.0;26.0; 31.0-Digital Data Transmittal Agreement and Limited License for Use-in Addendum No. 2
We would ask that two minor changes be made to the attached form:
First, that the acceptance period be changed from 24 hours to 5 days acceptance period to review files and complain of any defects. Five (5) days is what was provided in the first Release Form.

Second, language has been added requiring indemnification for any use of electronic drawings on the project. This was not in prior CAD Release Form and is unreasonable and are respectfully requesting that it be deleted. -

A. This question will be responded to in a future Addendum.

RFI #51

Q.-BP 05.0- The metal roof screen panel shown on the Drawing A-321 show the panels ribs running horizontal. However, Drawing S4.1 appears to be framed for vertical ribs. If the ribs run horizontal, the span for panels will be to long and additional vertical framing members will be required. Which way do the ribs run? Are additional supports required?

A. The ribs should run Vertical. See the attached BSK-A10 and BSK-A11, to be included in Addendum 4.

RFI #52

Q.-In regard to the Roof Mounted Metal Screening Material, please see the attached Wind Load Span Table from Morin-(the Basis of Design).
Please advise if additional tube supports on the Roof Top Screening will be required base on this data.

A. See Sketches BSK-A10 and BSK-A11. Spans are below the maximums listed in the "Span Tables" with the panels in a vertical orientation.

RFI #53

Q.-In reviewing Specification Sections 084113 and 085113 and the details and profiles on the Contract Documents for the Aluminum Windows types "A" and "B" we are looking for a clarification on how they are to be constructed.
In reading what is the specifications does not appear to be consistent as to what is shown on the drawings. Are they a Storefront Window System with a glazed in Casement window? Or are they totally a Pre-Glazed Window Systems.

B. This question will be responded to in a future Addendum.

RFI #54

Q. BP 12.0-
123553 2.4.A.3 and 2.4.A.10.: Spec. 2.4.A.3. specifies 1/4" hardboard backs "where not exposed",

while 2.4.A.10. specifies "Unexposed" cabinet backs to be maple or white oak plywood (and goes on to indicate this refers to backs behind solid doors). As the term "unexposed" is not defined, please clarify if hardboard backs are acceptable in cabinets with drawers.

123553 1.4.B.3 and 1.5.D.6.Regional Materials are specified, but not available from CIF. Is this acceptable?

123553 1.5.D.3 Recycled content: Goal may not be achievable using specified materials, especially since we are planning on using Combination-core plywood for fronts. Will this be acceptable?

123553 2.2.F. Acid cabinets will be CiF standard to match balance of casework. Hinges will be stainless steel, not wood (these are protected by the liner). Is this acceptable?

123553 2.4.A.7. CIF does not offer particle-core with hardwood stiles and rail construction. We will quote combination-core doors in lieu of particle-core with hardwood stiles and rails. Is this acceptable?

123553 2.4.A.8. Same as 2.4.A.7. except 1" thick for tall doors

123553 2.6.I. Specifies "epoxy powder-coated" pilasters and clips. Epoxy coated not available from CIF; is standard anachrome finish acceptable?

123553 2.6.J. Calls for 1 inch "solid hardwood" for wall shelves. If any, these will be 1" veneer-core plywood with edgebanding all edges. Is this acceptable?

A. This question will be responded to in a future Addendum.

RFI #55

Q.-BP 12.0-

115313 2.3.B and B.1 Please confirm any VAV sensors and controllers are by HVAC contractor, not 115313. Further, please be advised that it not generally recommended that pass-through fume hoods run on a VAV system.

115313 3.4.A.1.i and i. 1) Contradiction on what water service fixture is to be provided.
L611VB-BH is a deck mounted gooseneck with an integral vacuum breaker and a blade handle attached to it. (This fixture is controlled directly from the gooseneck.) L4285B is a lever handle fixture that is mounted on the corner post of the fume hood. (Controls service from one side of hood).
Which fixtures should we provide for the cold water?

115313 3.4.A.1.j and j. 1) Contradiction on what gas fixture is to be provided.
L4200-132SWSA is a deck mounted turret with two outlets (180 degrees) & one valve. (This fixture is controlled directly from the turret.) L4285B is a lever handle fixture that is mounted on the corner post of the fume hood. (Controls service from one side of hood).
Which fixture am we to provide for the gas?

115313 3.4.A.1.i and i. 1) Dwg P-901 Plumb Sch 115313 Fume Hood 3.4.A.1.i spec is for a cold water fixture. Plumbing Schedule on P-901 indicates hot and cold water rough-ins.
Please confirm fume hood plumbing services/fixtures are 1 each cold water and gas, controlled from one side of the hood.

A. This question will be responded to in a future Addendum.

RFI #56

Q.-BP 12.0
123553 2.7 C. 4. Epoxy Tops: The previously RFI #35 addresses the fact that marine edge with coved integral backsplash is no longer available from Durcon. The RFI suggests utilizing loose field applied splash with marine edge at the sink locations.

After consulting with Durcon we add the following to further support this approach: the tops with curved front edges would require a mold to fabricate with a marine edge. The lead time for the mold has been quoted at 8 weeks. There are a number of details regarding top intersections and finished ends that would add time to the design process before the mold fabrication could take place. This custom mold will also add significant cost to the project.

Our request is to make only the tops directly above the sink cabinet or ADA kneespace with marine edge.

A. This question will be responded to in a future Addendum.

RFI #57

Q.-BP 12.0-
BP 12.0 Scope of Work 42) Reference is made to Drawing H-501-specifically Detail 5. The Architectural and Lab Casework Trade Contractors shall furnish and install, typical as noted in Notes #1 and #3, "Air Valves, Fume Hood Monitors, Sash Sensors, and Control Wiring by Fume Hood …Contractor" and "Fume Hood Manufacturer Will Provide Interlocking Mechanism to Have Only One Side of Fume Hood in Use at One Time…

A) Please confirm that the intent of Note 1 H-501 is for the fume hood control contractor to provide these items, not the Architectural and Lab Casework Trade Contractors to furnish and install thee items (as is noted in scope of work).

B) Please note that specification 115313 Lab Fume Hoods does not require the sash interlock described in Note 3 H-501. The basis-of-design manufacturer, Labconco, does not offer a sash interlock. Labconco can provide an alarm which is triggered if both sash are opened at the same time (fume hoods are not currently specified with this alarm). Please confirm the fume hoods will NOT require the sash interlock noted on H-501.

A. This question will be responded to in a future Addendum.

RFI #58

Q.-BP 26.0-What is the fixture type for the 36' rows in the classrooms on drawing EL-112?
What is the fixture type for the wall lights and downlights in toilet rooms S104 and S103 on drawing EL-111?
What is the fixture type for the wall lights in classrooms on drawing EL-111?

A. The fixture types were omitted due to a printing error. The Electrical Drawings have been reissued as part of Addendum #4.

RFI #59

Q. BP 10.0-The Specifications calls for the Bathroom Toilet Partitions (stalls) to be Class A Fire Rated Material. With the desired hinges being stealth integral and color/pattern being "Shale" from Scranton. Scranton does not supply material that is fire rated with integral hinges in "shale' color/pattern. Pricing quotes from Scranton state "fire rated material is not available with integral hinges in "shale" color. Please advise.

A. This question will be responded to in a future Addendum.

RFI #60

Q. BP 09.0- In regard to the Scope of Work for BP 09.0-Section 15-the last paragraph states:
"Furnish and install high impact gypsum. Also include all abuse resistant and high impact gypsum board."
This is not indicated on the drawings or specifications. Is it needed?

A. No. Please disregard these notes as high impact gypsum, abuse resistant and high impact gypsum board is NOT required.

RFI #61

Q. BP 09.0-In regard to the Scope of Work for BP 09.0-Section 24-states the following:
"The drywall subcontractor shall provide all plywood sheathing throughout the project."
Please confirm that the use of "Densglass" type sheathing as specified is allowed on the CFMF.

A. Please disregard the note as it realtes to plywood sheathing. The use of "Densglass" or any of the products listed in Specification Section 061600 are acceptable.

RFI #62

Q. BP 23.0-Regarding the Scope of Work for BP 23.0-HVAC-Qualification Item #10 states:

"Include the maintenance and repair of all new and existing HVAC systems until the entire phase is complete."
What is meant by this Qualification?

A. The sentence should have read "Include the maintenance and repair of all existing HVAC systems until the entire phase is complete." The scope of this work includes, but is not limited to, the following:
Drawing HD-112 Keynotes #7 and #11; (Also included in your Scope of Work)
Drawing H-112 Keyed Notes #2, #3, #4 and #5; (Also included in your Scope of Work)
Section/Paragraph #20 and Qualifications #42 and #56 in your Scope of Work

RFI #63

Q. BP 05.0-Please confirm that BP 05.0 owns furnishing and installing the "Formed Metal Walls Panels on the Roof."

A. Yes. BP 05.0 owns furnishing and installing the Formed Metal Wall Panels as per Specification Section 074213.13. This is assigned under Section/Paragraphs #1 and #2. It is also assigned under Qualifications-Item #45.

RFI #64

Q.-BP 26.0-Which Bid Package is responsible for providing the under-cabinet light?

A. BP 26.0-Electrical is responsible for providing the undercabinet light fixtures.

RFI #65

Q. BP 12.0-123553 Detail 1,2,3,4/A-581 This detail indicates wood legs to be 3" square. Although CIF can provide 3" square legs we do not have a source for 3" black rubber boots to fit over the leg. Please confirm CIF standard dimension 2-¼" square leg with black boot is acceptable

A. This question will be responded to in a future Addendum.

RFI #66

Q. BP 12.0-123553 2.6 C. Are the "Solid aluminum rectangular style finger pulls" used on this project? If so please provide manufacturer and model number.

A. This question will be responded to in a future Addendum.

RFI #67

Q. BP 02.0-As part of the Demolition and Abatement Scope of Work, we know that we need to remove and eventually replace the glass panel at the Northwest end of the Second Floor Corridor. Is there any additional information that can be provided as far as the removal protocols?

A. Yes, please refer to JCJ's Addendum #4. Specifically, Page 1 under Project Manual-Item #3 which states:
"Exterior caulks and window glazing compounds associated with the second-floor hallway window system have not been tested for hazardous materials. The caulks and glazing compounds are assumed to contain asbestos and polychlorinated biphenyls (PCB) greater than 50 parts per million (ppm). During window #10, the Contractor and workers performing this work shall coordinate all work with the Owner's Consultant and follow all of the requirements and procedures outlined in Section 020800 Asbestos Abatement and 020840 PCB Remediation."

END OF ADDENDUM NO. 4

Bid Form "A"
Proposal Form

William H. Hall High School
Science Classroom Project
975 North Main Street
West Hartford, CT 06117
State Project No. 155-0240 EA

Bid Package No. _____

Bid Submitted by:

_____
Company Name

_____
Street Address

_____
City, State & Zip Code

Contact

(_____) . (_____) (_____) . (_____)
Telephone No *Fax No.*

The undersigned, having familiarized themselves with the existing conditions of the, but is not limited to, the project area affecting the cost of the work, and with the Contract Documents (which includes Invitation to Bid, Bid Form, Bid Bond, Instructions to Bidders, Non-Collusion Affidavit, Addenda, General Conditions, Project Conditions, Technical Specifications, Drawings as listed in the Schedule of Drawings, and form of Surety Bond) hereby proposes to furnish all machinery, tools, appurtenances, equipment, and services, including utility and transportation services required to construct and complete the work, all in accordance with the above listed Documents, and submits herewith in conformity with the project manual and subsequent addenda, the following bid:

The total amount of the Bid as computed by the undersigned Bidder is (in words):

_____

_____

Dollars and Cents

(and figures) $_____

The Fusco Corporation reserves the right to make the award on the basis of the above Base Bid.

In submitting this Bid, the Bidder understands that the Fusco Corporation reserves the right to accept or reject all or any part of this bid, to reject any and all bids, or to waive any informalities, irregularities, or technical defect in submitted bids. The Bidder also understands that the Fusco Corporation reserves the right to accept any, all, or none of the Alternates, which may be listed above, and may accept Alternates in any order at Fusco Corporation's sole discretion. The Bidder agrees to perform the work of each accepted Alternate for the sum quoted above for each, and to include such accepted Alternates in the Contract for Construction.

If written notice of the acceptance of this Bid and any or all of the Alternates is mailed, telegraphed, or otherwise delivered to the undersigned within ninety (90) days after the opening of the Bid, or at any time thereafter before the Bid is withdrawn, the undersigned agrees to sign the Subcontract, and to furnish the required bonds within ten (10) days after the Subcontract is presented to them for signature.

Bid Bond:

The undersigned herewith submits security equal to ten percent (10%) of the Base Bid, the sum of: _____dollars and no cents

$_____

This security shall be the sole and exclusive property of the Fusco Corporation as liquidated damages to the City, if the undersigned fails to execute a Contract in conformity with the accompanying forms, after due date notification therefore in the Contract Documents.

Bidders shall furnish with their bids (in triplicate) the following:

1. Bid Forms A through F (document 000950)
2. Bid Bond (document A310)
3. Certification as to Corporate Principal (document 000312)
4. Form of Surety (document 000315)
5. Non-Collusion Affidavit of Prime Bidder (document 00320)
6. CHRO Notification to Bidders (document 00350-4)
7. Certification of Bidder Regarding EEO (document 00360)
8. Department of Administrative Services (DAS) "Contractor Prequalification Certificate" and "Update Statement" (document 000412A)
9. Statement of Bidder's Qualifications (document 000412C)
10. Contractors Wage Certification Form (document 000847)

Addenda:

The Bidder hereby acknowledges receipt of the following Addenda:

Addendum Number	Date received	Signature

Bidder's Official Name and Address:

_____

Company Name

_____

Street Address

_____

City, State & Zip Code

Contact Name:

_____ _____

Signature Title

_____

Date

Bid Form "B"

William H. Hall High School
Science Classroom Project
975 North Main Street
West Hartford, CT 06117
State Project No. 155-0240 EA

The following Labor Rates shall apply when Changes in your Scope of Work (*adds and deducts*) are requested by the Owner/Construction Manager per the General Conditions of the Contract for Construction, where Unit Prices are not applicable and a Lump Sum Cost proposal cannot be agreed upon. The labor rate shall only include those categories as listed below plus the allowable percentage for Overhead and Profit. Overhead and Profit is calculated on add and deduct changes in scope. Trade-related equipment, hand tools and power tools, normally supplied with the labor, shall not be included in the Labor Rate. The Overhead and Profit is defined as all other incidental costs, Main Office Expenses, Main/Field Office Staffing, Project Management, Supervision, Insurances, Travel Expenses, etc.
Under no circumstances will Subcontractor be entitled to any OH&P in excess of that set forth in Article 6(f) "Changes, Claims", of the Subcontract. All subcontractors are required to use the attached form for labor rates.

Please fill out the attached "Change Order Labor Rate" form and return with bid; along with Fringe benefits backup, and your Workmans Comp backup and EMR backup.

All labor rates of this Subcontractor and any sub tier subcontractors are subject to full audit at any time. The Owner/Construction Manager reserve the right to review and audit all rates prior to award.

Change Order Labor Rates

Contractor & Address/Phone:

Name
Address
Phone

Date

Trade : **Classification:**

		*				
		%	**Straight Time**	**Over Time**	**Double Time**	**Premium**
Base Rate				$ -	$ -	$ -
Taxes						
	FICA - %	7.65%	$ -	$ -	$ -	$ -
	Federal Unemployment - %		$ -	$ -	$ -	$ -
	State Unemployment - %		$ -	$ -	$ -	$ -
Insurance:						
	Worker's Compensation - % *		$ -	$ -	$ -	
	General Liability - % **		$ -	$ -	$ -	
Benefits:	Union ****					
	Health & Welfare Fund -	Per Hrs. Worked		$ -	$ -	
	Pension Fund -	Per Hrs. Worked		$ -	$ -	
	Annuity Fund -	Per Hrs. Worked		$ -	$ -	
	Apprentice Fund -	Per Hrs. Worked		$ -	$ -	
	Health & Welfare Fund -	Per Hrs. Paid		$ -	$ -	$ -
	Pension Fund -	Per Hrs. Paid		$ -	$ -	$ -
	Annuity Fund -	Per Hrs. Paid		$ -	$ -	$ -
	Apprentice Fund -	Per Hrs. Paid		$ -	$ -	$ -
	Other					
		Per Hr.		$ -	$ -	
		Per Hr.		$ -	$ -	
		Per Hr.		$ -	$ -	
		Per Hr.		$ -	$ -	
		Per Hr.		$ -	$ -	
		Per Hr.		$ -	$ -	
	TOTAL		$ -	$ -	$ -	$ -

Contractor shall enter data into all fields highlighted in orange; for fields highlighted in blue, data will automatically populate.)

* *This is the % shown on your Ins Policy less any credits for EMR. Provide documentation*

** *This is the % shown on your Ins Policy for wages only. Provide documentation*

*** *Please provide union benefit package as documentation*

All rates are subject to audit.

Allowed	Disallowed
Base rate	Small Tools
FUTA	Vacation
SUTA	Phone
FICA	Miscellaneous
Workman's Comp	Testing
Gen Liability on wages	Training
Union Benefits	Supplies
	Equipment
	Mobilization
	Incidentals
	Holiday

Bid Form "C"
Alternates

William H. Hall High School
Science Classroom Project
975 North Main Street
West Hartford, CT 06117
State Project No. 155-0240 EA

ALTERNATE BIDS

All Bidders shall include within his or her Bid any additional costs associated with the Alternates as listed below and in the Specifications. Should an Alternate not apply to your Scope of Work, indicate so on the Bid Form provided.

The Alternate Bid prices shall be listed on Bid Form "C" and shall include all necessary labor, materials; equipment, installation; cost for delivery; machinery; insurance; applicable taxes; supervision, overhead; and profit. Should an Alternate be accepted, the cost or credit as noted on the above form shall be added or deducted from the Contract Value via Change Order.

The Undersigned further proposes and agrees that should the following alternate or alternates be accepted and included in this Contract, the amount of base bid, as heretofore stated, shall be increased by stated alternate amount. All materials and workmanship shall be in strict accordance with original specifications and drawings.

The Contract requirements shall be an integral part of the alternates. The base bid shall include all work shown on the drawings and specifications irrespective of any items included in the alternative. The alternate is subject to acceptance or rejection by the Owner without affecting the price of the base bid. A Contract may be awarded on any base bid-alternate combination that is in the best interest of the Owner. Contractors shall perform all work required to complete execution of the accepted alternate. The amount of the alternate price shall include the cost of any and all modifications made necessary by the Owner's acceptance and all Contractor's expenses including overhead and profit. The bidding contractor shall state the amount of the alternate listed below. No response to the alternates will be interpreted as no change in cost.

SECTION 012300 - ALTERNATES
PART 1 – GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.

2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

B. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Membrane Roofing:

1. Base Bid: Provide TPO membrane roofing as specified in Section 075423 "Thermoplastic Polyolefin (TPO) Roofing."

2. Alternate: Provide PVC Membrane Roofing as specified in Section 075419 "Polyvinyl-Chloride (PVC) Roofing."

$ _____

B. Alternate No. 2: Incoming Primary Power-New Additions:

1. Base Bid: Provide all labor, material and equipment to provide the incoming primary power conduits and pull strings from the electrical transformer located at the Northeast corner of the existing Portable Classrooms.

2. Alternate: Provide all labor, material and equipment to provide the incoming primary power conduits and pull strings from the existing electrical transformer located on the North side of the existing High School.

$_____

C. Alternate No. 3: Snap Trim-**ADDENDUM #4**

1. Base Bid: Provide all labor, material and equipment to furnish and install Aluminum all Window Types as specified in Section 085113 "Aluminum Windows" and as indicated on the Contract Drawings **without** the "Snap Trim."- **ADDENDUM #4**

2. Alternate: Provide all labor, material and equipment to furnish and install the "Snap Trim" on the Window Types as specified in Section 085113 "Aluminum Windows" and as indicated on the Contract Drawings. **ADDENDUM #4**

$_____

Bid Form "D"
Allowances

William H. Hall High School
Science Classroom Project
975 North Main Street
West Hartford, CT 06117
State Project No. 155-0240 EA

All Bidders shall include within the bid price the applicable Bid Allowances listed below. Should an Allowance not apply to your Scope of Work, indicate so on the Bid Form provided.

This Subcontractor shall include within the Subcontract Price, the allowances as listed below. Allowances as listed below shall include all necessary material, cost for delivery, installation, machinery, insurance, applicable taxes, overhead, and profit.

The amounts quoted by the bidder for the allowances listed are inclusive of all costs, direct and indirect, required for the proper completion of the work for the Bid Package quoted. This includes, but is not limited to; labor, material, equipment, insurance, taxes, bond, overhead, profit, and all else required to complete the work as described in the allowance.

All adjustments to an Allowance or scope of work shall be made via Change Order. No adjustments for Overhead, Profit, Supervision and the like will be allowed. Any unused portion of an allowance shall be returned to the Owner via a deduct Change Order to this Subcontractors Contract Value. Allowances shall appear as a line item on the Subcontractor's Schedule of Values.

It is understood that the Subcontractor has included in the contract price all allowances contained in the Contract Documents and shall cause the Work so covered to be performed by such subcontractors or suppliers and for such sums within the limit of the allowances as may be acceptable to the Construction Manager.

The Subcontractor agrees as follows:

The allowances include the cost to the Subcontractor, less any applicable trade discounts, of materials and equipment required by the allowances to be delivered at the site;

The Subcontractor's costs for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the contract price and not in the allowances; and

No demand for additional payment on account of any thereof shall be valid. Prior to final payment, an appropriate change order shall be issued as recommended by the Construction Manager to reflect actual amounts due the Subcontractor due to work covered by allowances and the contract price shall be correspondingly adjusted. Any unused portion of any Allowance shall be deducted from the Contract Value via Change Order

1.	Water Company Charges	$ 5,000	Plumbing
2.	Gas Company Charges	$ 2,500	Plumbing
3.	Electric Company Charges	$30,000	Electrical
4.	Utility Company Fees Temp. Electric	$ 5,000	Electrical
5.	Telephone Company Charges	$ 5,000	Site
6.	CCTV Company Charges	$ 2,500	Site
7.	Temp. Heating Units-Rental	$ 5,000	Mechanical
8.	Temp. Heating Units-Fuel Consumption	$20,000	Mechanical

9. Acoustical Minor Work/Provisions:

   The Acoustical and Fabric Wrapped Panel Subcontractor shall carry in their base bid an additional 80 hours of installer time to perform additional minor work not indicated and as directed by the Construction Manager in addition to all other work indicated in this scope. This Allowance shall be used exclusively by the Construction Manager to provide labor, material and equipment to temporarily remove and then replace the existing Acoustical Ceiling Tile and Grid in order to support the MEPS Trades.

10. Resilient Tile Minor Work/Provisions:

    The Resilient Flooring Subcontractor shall carry in their base bid an additional 40 hours of installer time and $1,000 for materials to perform additional minor work not indicated and as directed by the Construction Manager in addition to all other work indicated in this scope. The additional materials included with this time shall include floor patching materials. This Allowance shall be used exclusively by the Construction Manager for the infill of abandoned floor penetrations on the second floor of the existing Building as a result of the Demolition. All existing holes will need to "coned-out" in order to prevent infill material from falling through the slab.

11. Plumbing Minor Work/Provisions:

    The Plumbing Subcontractor shall carry in their base bid the labor, material and equipment to install an additional 200'- linear feet of 4" pipe insulation to perform additional minor work not indicated and as directed by the Construction Manager in addition to all other work indicated in this scope. This Allowance shall be used exclusively on the **existing to remain** 4" storm water piping. **ADDENDUM NO. 2**

Bid Form "E"
Unit Prices

William H. Hall High School
Science Classroom Project
975 North Main Street
West Hartford, CT 06117
State Project No. 155-0240 EA

The Contractor shall include within his or her Bid the Unit Prices as listed in the Specifications section 012200-Unit Prices. Should a Unit Price not apply to your Scope of Work, indicate so on the Bid Form provided.

The undersigned further proposes and agrees that should the amount of work required be increased or decreased, as directed by the Architect/CM, the following supplemental Unit Prices will be the basic price in place for computing extra cost. The stated costs are to be for "Additions" or "Deletions" of work to the Trade Contractor's Contract. All Unit Prices shall include all cost of work to the representative contractor, including all charges for materials, labor, plant, equipment, overhead, profit, additional insurance, taxes and all charges of whatever kind.

Acceptance of a unit price amount, if any, is subject to review by the Architect and Construction Manager and final approval of the Owner.

Any and all adjustments to the Contract shall be made via Change Order. No adjustments for Overhead; Profit; Supervision and the like will be allowed.

SECTION 012200 - UNIT PRICES
PART 1 GENERAL -
1.1 SUMMARY
A. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the project Scope of Work is altered.

B. Unit prices include material, any direct or indirect expenses of the Contractor or Sub-Contractor, profit, insurance, bonding and any applicable taxes. The same unit price shall apply whether the work is added or deducted.

3.1 UNIT PRICE SCHEDULE

Unit Prices in accordance with the following schedule will apply to this Contract.

Item No. 1 – ASBESTOS CONTAINING FLOOR TILE AND ASSOCIATED PCB CONTAINING MASTIC (All Layers to Bare Substrate), REMOVAL AND DISPOSAL AS ASBESTOS AND PCB BULK PRODUCT WASTE.

$_____ per square foot.

Item No. 2 – FLOOR TILE AND ASSOCIATED PCB CONTAINING MASTIC (All Layers to Bare Substrate), REMOVAL AND DISPOSAL AS PCB BULK PRODUCT WASTE.

$_____ per square foot.

Item No. 3 – ASBESTOS AND PCB CONTAINING VINYL COVE BASE ADHESIVE, REMOVAL AND DISPOSAL OF COVE BASE, ADHESIVE AND SUBSTRATE AS ASBESTOS AND PCB BULK PRODUCT WASTE.

$_____ per linear feet.

Item No. 4 – PCB CONTAINING VINYL COVE BASE ADHESIVE, REMOVAL AND DISPOSAL OF COVE BASE, ADHESIVE AND SUBSTRATE AS PCB BULK PRODUCT WASTE.

$_____ per linear foot.

Item No. 5 – ASBESTOS CONTAINING SINK UNDERCOATING, REMOVAL AND DISPOSAL AS ASBESTOS WASTE.

$_____ per sink.

Item No. 6 – INTERIOR CAULK AT COLUMNS, REMOVAL AND DISPOSAL OF CAULK AND ASSOCIATED BRACKET AS ASBESTOS AND CONNECTICUT REGULATED PCB WASTE (CR01).

$_____ per linear foot.

Item No. 7 – INTERIOR CAULK AT SINKS AND COUNTERTOPS, REMOVAL AND DISPOSAL OF CAULK, SINK AND ADJACENT COUNTERTOP AS ASBESTOS AND PCB BULK PRODUCT WASTE.

$_____ per sink

Item No. 8 – ASBESTOS CONTAINING PANELS AT FUME HOODS, REMOVAL AND DISPOSAL AS ASBESTOS WASTE.

$_____ per square foot.

Item No. 9 – WINDOW GLAZING COMPOUND, REMOVAL AND DISPOSAL OF ENTIRE WINDOW SASH AS ASBESTOS AND PCB BULK PRODUCT WASTE.

$_____ per sash.

Item No. 10 – INTERIOR CEMENT BOARD INSULATION TO PANEL ABOVE WINDOW, REMOVAL AND DISPOSAL AS ASBESTOS WASTE.

$_____ per unit (each).

Item No. 11 – PREPARATION OF A SMALL CONTAINMENT (for abating asbestos or PCBs >3 SF/3 LF but <260 LF/160 SF) WITH DECONTAMINATION UNIT (including remobilization, if necessary).

$_____ per containment.

Item No. 12 – PREPARATION OF A LARGE CONTAINMENT (for abating asbestos or PCBs >260 LF/160 SF) WITH DECONTAMINATION UNIT (including remobilization, if necessary).

$_____ per containment.

Item No. 13 – DOOR AND WINDOW CAULK, REMOVAL AND DISPOSAL AS PCB BULK PRODUCT WASTE.

$_____ per linear foot.

Item No. 14 – INTERIOR CONCRETE BLOCK AND ASSOCIATED MORTAR (full thickness of block), REMOVAL AND DISPOSAL AS PCB BULK PRODUCT WASTE.

$_____ per square foot (exposed surface area)

Item No. 15 – EXTERIOR BRICK AND ASSOCIATED MORTAR (full thickness of brick), REMOVAL AND DISPOSAL AS PCB BULK PRODUCT WASTE.

$_____per square foot (exposed surface area)

Item No. 16 – CONCRETE BLOCK AND CONCRETE WALL, REMOVAL OF ADDITIONAL 1/8 INCH AND DISPOSAL AS PCB BULK PRODUCT WASTE.

$_____ per square foot

Item No. 17 – CONCRETE FLOORS, REMOVAL OF ADDITIONAL 1/8 INCH AND DISPOSAL AS PCB BULK PRODUCT WASTE.

$_____ per square foot

Item No. 18-FILL: 3/8” STONE IN 12” LIFTS WITH VIBRATORY COMPACTION TO NOT LESS THAN 95% MODIFIED PROCTOR DENSITY. THE UNIT PRICE SHALL INCLUDE THE EXCAVATION, LOADING, HAULING AND PROPER DISPOSAL OF THE EXISTING ON SITE MATERIAL.

$_____per ton

Item No. 19-CONTROLLED/STRUCTURAL FILL: COMPACTED EARTH FILL IN 12" LIFTS WITH VIBRATORY COMPACTION TO NOT LESS THAN 95% MODIFIED PROCTOR DENSITY. THE UNIT PRICE SHALL INCLUDE THE EXCAVATION, LOADING, HAULING AND PROPER DISPOSAL OF THE EXISTING ON SITE MATERIAL.

$_____per ton

Item No. 20-PROVIDE ADDITIONAL 2" ACID WASTE (AW) DWV WASTE LINE. UNIT PRICE SHALL INCLUDE ALL TESTING, HANGERS, CLEANOUTS, FITTINGS, SLEEVES, FIRE SAFING AND CAULKING AND PIPE LABELING.

$_____per linear

Item No. 21-PROVIDE ADDITIONAL 3" SANITARY (SAN, S) DWV WASTE LINE. UNIT PRICE SHALL INCLUDE ALL HANGERS, CLEANOUTS, FITTINGS, TESTING, SLEEVES, FIRE SAFING AND CAULKING, AND PIPE LABELING.

$_____per linear foot

Item No. 22-PROVIDE ADDITIONAL 4" STORM WATER (SW) DWV WASTE LINE. UNIT PRICE SHALL INCLUDE ALL HANGERS, CLEANOUTS, FITTINGS, SLEEVES, FIRE SAFING AND CAULKING, TESTING AND PIPE LABELING.

$_____per linear foot

Item No. 23-PROVIDE ADDITIONAL ½" DOMESTIC COLD WATER (DCW) AND/OR - DOMESTIC HOT WATER (DCW). UNIT PRICE SHALL INCLUDE ALL HANGERS, FITTINGS, INSULATION, TESTING, SLEEVES, FIRE SAFING AND CAULKING, AND PIPE LABELING.

$_____per linear foot

Item No. 24- PROVIDE ADDITIONAL 3/4" DOMESTIC COLD WATER (DCW) AND/OR - DOMESTIC HOT WATER (DCW). UNIT PRICE SHALL INCLUDE ALL HANGERS, FITTINGS, INSULATION, TESTING, SLEEVES, FIRE SAFING AND CAULKING, AND PIPE LABELING.

$_____per linear foot

Item No. 25- PROVIDE ADDITIONAL 1" TEMPERED WATER (TW). UNIT PRICE SHALL INCLUDE ALL HANGERS, FITTINGS, INSULATION, TESTING, SLEEVES, FIRE SAFING AND CAULKING, AND PIPE LABELING.

$_____per linear foot

Item No. 26- PROVIDE ADDITIONAL 4" STORM WATER PIPE INSULATION. UNIT PRICE SHALL INCLUDE COVERING ALL HANGERS, FITTINGS, SLEEVES, FIRE SAFING AND CAULKING, AND PIPE LABELING.

$_____per linear foot-**ADDENDUM No. 2**

Item No. 27- PROVIDE ADDITIONAL 6" STORM WATER PIPE INSULATION. UNIT PRICE SHALL INCLUDE COVERING ALL HANGERS, FITTINGS, SLEEVES, FIRE SAFING AND CAULKING, AND PIPE LABELING.

$_____per linear foot- **ADDENDUM No. 2**

Bid Form "F"
Proposed Subcontractor Listing

William H. Hall High School
Science Classroom Project
975 North Main Street
West Hartford, CT 06117
State Project No. 155-0240 EA

This form shall be filled out by each bidder. Attach additional sheets if necessary.

Subcontractor Name And Address	Trade	Contract Amount	Certificate Type *(SBE,MBE, WBE,)*	*SBE 25%* *MBE 6.25%*

Construction Manager and Owner reserve the right to disapprove any proposed Subcontractor without prejudice.

ADDENDUM NO. 4

DATE: March 23, 2018

PROJECT: William Hall High School
Science Classroom Project
975 North Main Street
West Hartford, Connecticut
State Project No. 155-0240 EA

FROM: JCJ Architecture, Inc.
120 Huyshope Avenue, Suite 400
Hartford, Connecticut 06106
(860) 247-9226

TO: Bidders of Record

This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated February 6, 2018. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of three **(3) pages** and the following attached documents:

1. Drawings.
2. Sketches.
3. Specification Sections.

GENERAL:

1. CLARIFICATION:
   There was a printing error which is evident in the electrical drawings. This resulted in some text being lost from the drawings, particularly in the lighting fixture types on the electrical lighting plans and the electrical panel numbers. The re-issued electrical drawings, enclosed, clarify these items. The drawings include all changes which were issued as apart of Addendum #3.

PROJECT MANUAL:

1. Table of Contents: ADD section 012100 ALLOWANCES
2. Table of Contents: ADD section 012200 UNIT PRICES
3. HAZARDOUS MATERIALS ABATMENT SPECIFICATIONS
   ADD to specification:
   Exterior caulks and window glazing compounds associated with the second floor hallway window system have not been tested for hazardous materials. The caulks and glazing compounds are assumed to contain asbestos and polychlorinated . biphenyls (PCB) greater than 50 parts per million (ppm). During window removal as defined in BP No. 02.0 Demolition & Abatement Scope of Work, Item

#10, the Contractor and workers performing this work shall coordinate all work with the Owner's Consultant and follow all of the requirements and procedures outlined in Section 020800 Asbestos Abatement and 020840 PCB Remediation.

4. Section 076200 SHEET METAL FLASHING AND TRIM
   1.2 SUMMARY:
   A.4 Formed roof-drainage sheet metal fabrications.
5. Section 076200 SHEET METAL FLASHING AND TRIM
   2.4 SHEET METAL FABRICATIONS:
   I. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors.
   1. Fabricated Hanger Style: Fig 1-35H according to SMACNA's "Architectural Sheet Metal Manual."
   2. Fabricate from the following materials:
   a. Aluminum: 0.024 inch (0.61 mm) thick.
   J. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fabricate from the following materials:
   1. Zinc-Tin Alloy-Coated Copper: 16.0 oz./sq. ft. (0.0216" thick).
   K. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes, exterior flange trim. Fabricate from the following materials:
   1. Aluminum: 0.032 inch (0.81 mm) thick.
6. Section 081416 FLUSH WOOD DOORS
   2.3A.2 **CHANGE** wood species to white maple.
7. Section 115313 LABORATORY FUME HOODS
   2.3C. Fume hoods shall be designed with vaporproof lighting fixtures and electrical systems in accordance with SEFA 1.
8. Section 123553 LABORATORY CASEWORK
   2.1 MANUFACTURERS – section modified to include CIF Lab Solutions as an acceptable manufacturer.

DRAWINGS:

1. A-201: **REVISE** orientation of rooftop screen cladding.
2. A-321: **REVISE** orientation of rooftop screen cladding
3. P-111: **CHANGE** invert elevation of acid waste piping to 153.50 at point of the point of the inlet to the acid neutralization vault.
4. P-901: **CHANGE** model number of plumbing fixture P6 to HAWS 8320-8325.
5. P-901: **CHANGE** plumbing fixture schedule note #11 to read: “Provide with options 9102 and SP829SS.

RE-ISSUED DRAWINGS:

1. E-000
2. ELD-112
3. EL-111

4. EL-112
5. EPD-112
6. EP-111
7. EP-112
8. EP-113
9. EC-111
10. EC-112
11. ES-111
12. ES-112
13. ES-201
14. E-201
15. E-202
16. E-301
17. E-401

SKETCHES:

1. BSK-A10
2. BSK-A11

END OF ADDENDUM NO. 4

TABLE OF CONTENTS

VOLUME 2 0F 3

DIVISION 26 - ELECTRICAL

DIVISION 27 - COMMUNICATIONS

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

DIVISION 31 - EARTHWORK

DIVISION 32 -EXTERIOR IMPROVEMENTS

DIVISION 33 -UTILITIES

END OF TABLE OF CONTENTS

SECTION 012100 ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump-sum allowances.
2. Unit-cost allowances.
3. Quantity allowances.
4. Contingency allowances.
5. Testing and inspecting allowances.

C. Related Requirements:

1. Section 012200 "Unit Prices" for procedures for using unit prices.
2. Section 014000 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architect's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 ACTION SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.5 INFORMATIONAL SUBMITTALS

A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.6 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.7 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include [**taxes,**]freight[**,**] and delivery to Project site.

B. Unless otherwise indicated, Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner under allowance shall be included as part of the Contract Sum and not part of the allowance.

1.8 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

B. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.9 TESTING AND INSPECTING ALLOWANCES

A. Testing and inspecting allowances include the cost of engaging testing agencies, actual tests and inspections, and reporting results.

B. The allowance does not include incidental labor required to assist the testing agency or costs for retesting if previous tests and inspections result in failure. The cost for incidental labor to assist the testing agency shall be included in the Contract Sum.

C. Costs of services not required by the Contract Documents are not included in the allowance.

D. At Project closeout, credit unused amounts remaining in the testing and inspecting allowance to Owner by Change Order.

1.10 ADJUSTMENT OF ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowances as indicated on Bid Form.

END OF SECTION 012100

SECTION 012200 UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for unit prices.

B. Related Requirements:

1. Section 012600 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.
2. Section 014000 "Quality Requirements" for general testing and inspecting requirements.

1.3 DEFINITIONS

A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, overhead, and profit.

B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

A. See Bid Form for Unit Prices.

END OF SECTION 012200

SECTION 076200 SHEET METAL FLASHING AND TRIM

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 sheet metal flashing and trim in the following categories:

1. Exposed trim.
2. Metal flashing.
3. Metal counterflashing and base flashing.
4. Formed roof-drainage sheet metal fabrications.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 018113 “Sustainable Design Requirements.”
2. Division 07 Section "Thermoplastic Polyolefin (TPO) Roofing" for installing sheet metal flashing and trim integral with membrane roofing.
3. Division 07 Section “Roof Specialties” for formed aluminum fascia and coping systems.
4. Division 07 Section "Roof Accessories" for set-on-type curbs, equipment supports, roof hatches, vents, and other manufactured roof accessory units.
5. Division 07 Section "Joint Sealants" for elastomeric sealants.
6. Division 07 Roofing Sections for flashing and roofing accessories installed integral with roofing membrane as part of roofing-system work.

1.3 PERFORMANCE REQUIREMENTS:

A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

1.4 SUBMITTALS:

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Sustainable Design Submittals:

1. A completed Green Building Materials Form, per Section 018113 – Sustainable Design Requirements: Information to be supplied includes:

    a. Material cost(s) for building materials included in contractor's or subcontractor's work. The Materials cost shall not include costs associated with contractor's or subcontractor's labor or equipment.
    b. The amount of post consumer and/or post industrial recycled content in the supplied product(s).
    c. The location of origin and manufacture for the supplied product(s).

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
3. Product Cut Sheets for all materials that meet the Connecticut High Performance Building Requirements of this Section.
4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).
5. Product Data: For sealants, indicating VOC content.
6. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
7. Product Data: For interior field applied adhesives, sealants and sealant primers, provide Manufacturers' product technical data including printed statement of VOC content.

C. Product Data including manufacturer's material and finish data, installation instructions, and general recommendations for each specified flashing material and fabricated product.

D. Shop Drawings of each item specified showing layout, profiles, methods of joining, and anchorage details.

E. Samples of sheet metal flashing, trim, and accessory items, in the specified finish. Where finish involves normal color and texture variations, include Sample sets composed of 2 or more units showing the full range of variations expected.

1. 8-inch- square Samples of specified sheet materials to be exposed as finished surfaces.
2. 12-inch- long Samples of factory-fabricated products exposed as finished Work. Provide complete with specified factory finish.

F. Qualification data for firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.5 QUALITY ASSURANCE:

A. Mockups: Prior to installing sheet metal flashing and trim, construct mockups indicated to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.
2. Notify Architect one week in advance of the dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and workmanship.
4. Construct mockups for the following type of sheet metal flashing and trim:

    a. Gutters and downspouts.
    b. Conductor heads.
    c. Exposed trim, flashings, and concealed flashings.

    d. For Each Worker: Soldered samples of laps and end dams to be reviewed and approved by Architect and Commissioning Agent.

5. Obtain Architect's approval of mockups before start of final unit of Work.
6. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

    a. When directed, demolish and remove mockups from Project site.

7. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 PROJECT CONDITIONS:

A. Coordinate Work of this Section with interfacing and adjoining Work for proper sequencing of each installation. Ensure best possible weather resistance, durability of Work, and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 METALS:

A. Zinc-Tin Alloy-Coated Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 temper, of minimum uncoated weight (thickness) indicated; coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin.

1. Products: Subject to compliance with requirements, provide the following:

a. Revere Copper Products, Inc.; FreedomGray, or equal.

B. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated and with not less than the strength and durability of alloy and temper designated below:

1. High-Performance Organic Finish: AA-C12C42R1x Organic Coating: as specified below. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

1) Color: Custom. Match Architect’s sample.

2.2 MISCELLANEOUS MATERIALS AND ACCESSORIES:

A. Solder for Zinc-Tin Alloy-Coated Copper: ASTM specification B32 and shall be pure tin OR lead-free, high-tin. Solder containing lead will not be allowed.

B. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

C. Asphalt Mastic: SSPC-Paint 12, solvent-type asphalt mastic, nominally free of sulfur and containing no asbestos fibers, compounded for 15-mil dry film thickness per coat.

D. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.

E. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed and complying with requirements for joint sealants as specified in Division 7 Section "Joint Sealants."

F. Adhesives: Type recommended by flashing sheet metal manufacturer for waterproof and weather-resistant seaming and adhesive application of flashing sheet metal.

G. Paper Slip Sheet: 5-lb/square red rosin, sized building paper conforming to FS UU-B-790, Type I, Style 1b.

H. Polyethylene Underlayment: ASTM D 4397, minimum 6-mil- thick black polyethylene film, resistant to decay when tested according to ASTM E 154.

I. Gutter Screen: 1/4-inch hardware cloth installed in sheet metal frames. Fabricate screen and frame of same basic material as gutters and downspouts.

J. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.

K. Cast Iron Downspout Boot: Cast iron body and strap with 5/16-inch diameter cast holes for flathead bolts. Factory painted primer gray, for field painting.

1. Product: Model B25A; Barry Pattern & Foundry Co., Inc., tel:(800) 524-1809.
2. Adaptor to transition from the 4"x4" down spout to 4" HDPE pipe beneath the ground.
3. Length: Custom length, reference Drawings.

2.3 FABRICATION, GENERAL:

A. Sheet Metal Fabrication Standard: Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.

B. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

C. Form exposed sheet metal Work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.

D. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams for Aluminum: Apply EPDM strip accross joint with adhesive or releasable tape, and coover with aluminum plate.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

E. Expansion Provisions: Space movement joints at maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions in Work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

F. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.

G. Separate metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other permanent separation as recommended by manufacturer.

H. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

I. Fabricate cleats and attachment devices from same material as sheet metal component being anchored or from compatible, noncorrosive metal recommended by sheet metal manufacturer.

1. Size: As recommended by SMACNA manual or sheet metal manufacturer for application but never less than thickness of metal being secured.

2.4 SHEET METAL FABRICATIONS:

A. General: Fabricate sheet metal items in thickness or weight needed to comply with performance requirements but not less than that listed below for each application and metal.

B. Exposed Trim: Fabricate from the following material:

1. Aluminum: 0.050 inch thick.

C. Base Flashing: Fabricate from the following material:

1. Zinc-Tin Alloy-Coated Copper: 16.0 oz./sq. ft. (0.0216" thick).

D. Counterflashing: Fabricate from the following material:

1. Zinc-Tin Alloy-Coated Copper: 16.0 oz./sq. ft. (0.0216" thick).

E. Flashing Receivers: Fabricate from the following material:

1. Zinc-Tin Alloy-Coated Copper: 16.0 oz./sq. ft. (0.0216" thick).

F. Equipment Support Flashing: Fabricate from the following material:

1. Zinc-Tin Alloy-Coated Copper: 16.0 oz./sq. ft. (0.0216" thick).

G. Roof-Penetration Flashing: Fabricate from the following material:

1. Zinc-Tin Alloy-Coated Copper: 16.0 oz./sq. ft. (0.0216" thick).

H. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches (150 mm) beyond each side of wall openings. Form with 2-inch- (50-mm-) high, end dams where flashing is discontinuous. Fabricate from the following materials:

1. Zinc-Tin Alloy-Coated Copper: 16.0 oz./sq. ft. (0.0216" thick).

I. Downspouts: Fabricate rectangular downspouts to dimensions indicated, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors .

1. Fabricated Hanger Style: Fig 1-35H according to SMACNA's "Architectural Sheet Metal Manual."
2. Fabricate from the following materials:

a. Aluminum: 0.024 inch (0.61 mm) thick.

J. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fabricate from the following materials:

1. Zinc-Tin Alloy-Coated Copper: 16.0 oz./sq. ft. (0.0216" thick).

K. Conductor Heads: Fabricate conductor heads with flanged back and stiffened top edge and of dimensions and shape required, complete with outlet tubes, exterior flange trim. Fabricate from the following materials:

1. Aluminum: 0.032 inch (0.81 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL:

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

1. Coat side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

1. Aluminum: Use aluminum or stainless-steel fasteners.
2. Tin-Zinc Alloy-Coated Copper: Use copper or stainless-steel fasteners.

H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.

1. Do not solder aluminum sheet.
2. Copper Soldering: Tin uncoated copper surfaces at edges of sheets using solder recommended for copper work.
3. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

I. Aluminum Flashing: Rivet or weld joints in uncoated aluminum where necessary for strength.

J. Equipment Support Flashing: Coordinate equipment support flashing installation with roofing and equipment installation. Weld or seal flashing to equipment support member.

K. Roof-Penetration Flashing: Coordinate roof-penetration flashing installation with roofing and installation of items penetrating roof. Install flashing as follows:

1. Turn copper flashing down inside vent piping, being careful not to block vent piping with flashing.

2. Seal and clamp flashing to pipes penetrating roof, other than copper flashing on vent piping.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Downspouts: Join sections with 1-1/2-inch (38-mm) telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.
2. Connect downspouts to underground drainage system.

C. Parapet Scuppers: Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.

1. Anchor scupper closure trim flange to exterior wall and solder to scupper.

D. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch (25 mm) below scupper discharge.

3.4 ROOF FLASHING INSTALLATION:

A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.

B. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing, 8-inches minimum above roof membrane. Install stainless-steel draw band and tighten.

C. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing, 8-inches minimum above roof membrane. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.

1. Secure in a waterproof manner by means of snap-in installation and sealant or lead wedges and sealant.

D. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:

1. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof.

3.5 WALL FLASHING INSTALLATION:

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of formed through-wall flashing is specified in Division 4 Section "Unit Masonry."

C. Reglets: Installation of reglets is specified in Division 4 Section "Unit Masonry" and "Cast Stone."

3.6 MISCELLANEOUS FLASHING INSTALLATION:

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.7 CLEANING AND PROTECTION:

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 081416 FLUSH WOOD DOORS

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. Solid-core doors with wood-veneer faces.
2. Sound control doors.
3. Factory finishing flush wood doors.
4. Factory machining for hardware.
5. Factory installed glazing.

B. Related Sections include the following:

1. Section 018113 “Sustainable Design Requirements.”
2. Division 08 Section "Door Hardware" for hardware requirements.
3. Division 08 Section "Glazing" for glass view panels in flush wood doors.

1.3 SUBMITTALS:

A. Product Data: For each type of door. Include details of core and edge construction, trim for openings, and louvers.

1. Include factory-finishing specifications.

B. Connecticut High Performance Building Submittal Requirements: Submit the following Connecticut High Performance Building certification items:

1. A completed Green Building Materials Form, per Section 018113 – Sustainable Design Requirements: Information to be supplied includes:

a. The percentage by weight of recycled content in the product(s). Identify post-consumer and/or pre-consumer recycled content.
b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
c. Provide material costs for the materials included in the contractor’s or subcontractor’s work. Material cost does not include costs associated with labor and equipment.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
3. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify that no added urea formaldehyde is present in any composite wood materials, agrifiber material or adhesive.
4. Documentation for "FSC Certified" wood products. Provide Chain-of-Custody documentation, per Forest Stewardship Council criteria for all wood materials that require FSC Certification in these specifications
5. Product Cut Sheets for all materials that meet the Connecticut High Performance Building Requirements of this section.
6. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).
7. Documentation for all new wood products, including FSC Certified. Provide vendor invoices for all permanently installed wood products, FSC Certified or not. Each wood product must be identified on a line-item basis, FSC products must be identified as such on a line item basis, the dollar value of each line item must be shown, the vendors Chain-of-Custody certificate number must be shown on any invoice that includes FSC products.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data.

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Indicate requirements for veneer matching.
4. Indicate doors to be factory finished and finish requirements.
5. Indicate fire ratings for fire doors.

D. Product Test Reports: From a qualified testing agency indicating and interpreting test results for sound ratings and compliance of fire ratings with requirements indicated.

E. Samples for Initial Selection: Color charts consisting of actual materials in small sections for the following:

1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.

F. Samples for Verification: As follows:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide set of three samples showing typical range of color and grain to be expected in the finished work.

2. Corner sections of doors approximately 8 by 10 inches with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.
3. Louver blade and frame sections, 6 inches long, for each material and finish specified.
4. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 QUALITY ASSURANCE:

A. Source Limitations: Obtain flush wood doors through one source from a single manufacturer.

B. Quality Standard: In addition to requirements specified, comply with WDMA I.S.1-A-04, Industry Standard for "Architectural Wood Flush Doors."

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 Wood Doors: Doors complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing according to NFPA 252 or UL 10C.

1. At doors tested in accordance with NFPA 252, after 5 minutes into the test, establish the neutral test pressure level in the furnace at 40 inches or less above the sill.
2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's written instructions.

1. Individually package doors in plastic bags or cardboard cartons.

B. Mark each door with individual opening numbers used on Shop Drawings. Use removable tags or concealed markings.

1.6 PROJECT CONDITIONS:

A. Environmental Limitations: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with requirements of the referenced quality standard for Project's geographical location.

1.7 WARRANTY:

A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form, signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span, or do not comply with tolerances in referenced quality standard.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
2. Warranty shall be in effect during the following period of time after the date of Substantial Completion:

a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Flush Wood Doors:

a. Algoma Hardwoods Inc.
b. Eggers Industries; Architectural Door Division.
c. Marshfield Door Systems, Inc.
d. VT Industries Inc.
e. Oshkosh Door Company.
f. Graham Wood Doors.

2.2 DOOR CONSTRUCTION, GENERAL:

A. Low-Emitting Materials: Provide doors made with adhesives and composite wood products that do not contain urea formaldehyde.

B. WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

2.3 INTERIOR FLUSH WOOD DOORS:

A. Doors for Transparent Finish: Comply with the following requirements:

1. Grade: Premium, with Grade A faces.
2. Faces: Select white ~~oak~~ maple plain rift sawn.
3. Match between Veneer Leaves: Book match.
4. Match within Door Faces: Center balance match.
5. Pair and Set Match: Provide for pairs of doors and for doors hung in adjacent sets.
6. Stiles: Same species as face or a compatible species.

    a. Provide manufacturer's standard laminated-edge construction for improved screw-holding capability and split resistance as compared to edges composed of a single layer of treated lumber.

B. Particleboard Cores: Comply with the following requirements:

1. Particleboard: ANSI A208.1, Grade LD-2.
2. Blocking: Provide wood blocking at particleboard-core doors as follows:

    a. 5-inch top-rail blocking.
    b. 5-inch bottom-rail blocking.
    c. 5-by-10-inch inner blocking for all surface mounted hardware.
    d. 5-inch midrail blocking, at doors indicated to have exit devices.
    e. To avoid lite/lock conflicts, doors with ½ glass lite or full glass lite shall be constructed from structural composite lumber (SCL) with the outer stile to be the same species as the face veneer. The outer stile shall be applied prior to beveling doors.

C. Fire-Rated Doors: Comply with the following requirements:

1. Construction: Construction and core specified above for type of face indicated or manufacturer's standard mineral-core construction as required to provide fire rating indicated.

2. Blocking: For mineral-core doors, provide composite blocking with improved screw-holding capability approved for use in doors of fire ratings indicated and as follows:

    a. 5-inch top-rail blocking.
    b. 5-inch bottom-rail blocking.
    c. 5-by-18-inch lock blocks.
    d. 5-inch midrail blocking.
    e. 5-by-10-inch inner blocking for all surface mounted hardware.

3. Edge Construction: At hinge stiles, provide manufacturer's standard laminated-edge construction with improved screw-holding capability and split resistance and with outer stile matching face veneer.

4. Pairs: Provide fire-rated pairs with fire-retardant stiles that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

2.4 INTERIOR FULL GLASS LIGHT WOOD DOORS:

A. Same requirements as Interior Flush Wood Doors, except for core.

1. Core: Structural composite lumber.

2.5 LIGHT FRAMES:

A. Wood Frames for Light Openings: As follows:

1. Wood Species: Same species as door faces.
2. Profile: Flush rectangular beads.

B. Sound Doors: Provide stops and moldings around glazed openings where indicated. Where multiple glazing is required, each piece of glass shall be capable of being removed independently.

1. Glass Products: Safety glass or fire-resistive glazing product meeting door's sound control and labeling requirements.

C. Wood Beads for Light Openings in Non-rated Doors: Manufacturer's standard wood beads matching veneer species of door faces.

1. Algoma: W-9 Flush Bead.
2. Eggers: #100 bead.
3. Marshfield: W-4, flush bead.
4. VT Industries: Flush glazing stop.
5. Oshkosh: WV-1 Flush Wood Stop.
6. Graham: M6G Flush Moulding for Lites.

D. Wood-Veneered Beads for Light Openings in Fire Doors: Manufacturer's standard wood-veneered noncombustible beads matching veneer species of door faces and approved for use in doors of fire rating indicated. Include concealed metal glazing clips and sealants where required for opening size and fire rating indicated.

1. Algoma: W-9 labeled wood veneered lite beading.
2. Eggers: 90 minute veneer wrapped lite bead.
3. Marshfield: #115, wood wrapped metal vision frame.
4. VT Industries: Veneer clad, non-combustible stop.
5. Oshkosh: WV-1-20 or MV-115 veneer clad Flush Wood Stop.
6. Graham: M2F Flush Moulding for Lites.

2.6 FABRICATION:

A. Fabricate flush wood doors in sizes indicated for Project site fitting.

B. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-rated doors.

C. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Metal Astragals: Premachine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

D. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.

1. Light Openings: Trim openings with moldings of material and profile indicated.
2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Division 8 Section "Glazing."

E. Sound Seals: Machine door for manufacturer's gasketing system to provide sound rating indicated. Provide automatic door bottoms at sill with smooth extruded aluminum threshold.

1. Reference Section “Door Hardware” for gasketing, door bottoms, and aluminum sills.

2.7 FACTORY FINISHING:

A. General: Comply with referenced quality standard's requirements for factory finishing.

B. Finish wood doors at factory.

C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.

1. Grade: Premium.
2. Finish: WDMA System TR-6 catalyzed polyurethane.
3. Staining “**ST-1**": Match Architect’s sample.
4. Effect: Filled finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION:

A. Hardware: For installation, see Division 8 Section "Door Hardware."

B. Manufacturer's Written Instructions: Install wood doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

1. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

D. Factory-Finished Doors: Restore finish before installation, if fitting or machining is required at Project site.

3.3 ADJUSTING AND PROTECTING:

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of Substantial Completion.

END OF SECTION 081416

SECTION 115313 LABORATORY FUME HOODS

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. Double-sided barrier-free bench-top laboratory fume hoods.
2. Laboratory gas and electrical service fittings in fume hoods.

B. Related Sections include the following:

1. Section 018113 “Sustainable Design Requirements.”
2. Division 09 Section "Resilient Wall Base and Accessories" for resilient base applied to wood laboratory casework.
3. Division 12 Section "Laboratory Casework" for wood laboratory casework, including countertops, sinks, and service fittings.
4. Division 23 Sections for fume hood duct connections, including ducts.
5. Division 22, 23 and 26 Sections for connecting service utilities at indicated point. Piping and wiring for service fittings within fume hoods and casework up to point of connection are specified in this Section.
6. Division 26 Sections for electrical connection of fume hoods.

1.3 REFERENCES:

A. NFPA 45 - Laboratory Fume Hoods.

B. SEFA 1 - Laboratory Fume Hoods.

1.4 PERFORMANCE REQUIREMENTS:

A. Containment: Provide fume hoods with the following performance ratings at a face velocity of 100 fpm and a release rate of 4.0 L/min. when tested according to ASHRAE 110:

1. As-Manufactured Rating: AM 0.10.
2. As-Installed Rating: AI 0.10.

B. Structural Performance: Provide fume hood components capable of withstanding the following loads without permanent deformation, excessive deflection, or binding of cabinet drawers and doors:

1. Fume Hood Base Stands: 50-lb/ft. work top, 75 lb/ft. on work top, plus weight of hood.

1.5 SUBMITTALS:

A. Product Data: For each type of laboratory fume hood specified.

B. Connecticut High Performance Building Submittal Requirements: Submit the following Connecticut High Performance Building certification items:

1. A completed Green Building Materials Form, per Section 018113 – Sustainable Design Requirements: Information to be supplied includes:

   a. The percentage by weight of recycled content in the product(s). Identify post-consumer and/or pre-consumer recycled content.
   b. The manufacturing location for the product(s); and the location (source) of the raw materials used to manufacture the product(s).
   c. Provide material costs for the materials included in the contractor's or subcontractor's work. Material cost does not include costs associated with labor and equipment.

2. Letters of Certification, provided from the product manufacturer on the manufacturer's letterhead, to verify the amount of recycled content.
3. Product Cut Sheets for all materials that meet the Connecticut High Performance Building Requirements of this section.
4. Material Safety Data Sheets (MSDS), for all applicable products. Applicable products include, but are not limited to adhesives, sealants, carpets, paints and coatings applied on the interior of the building. MSDS shall indicate the Volatile Organic Compound (VOC) limits of products submitted (If an MSDS does not include a product's VOC content, then product data sheets, manufacturer literature, or a letter of certification from the manufacturer can be submitted in addition to the MSDS to indicate the VOC content).

C. Shop Drawings: For laboratory fume hoods. Include plans, elevations, sections, details, and attachments to other work.

1. Indicate locations and types of service fittings, together with associated service connections required.
2. Indicate plumbing connections, duct connections, electrical connections, and locations of access panels.
3. Include roughing-in information for mechanical, plumbing, and electrical connections.
4. Show adjacent walls, doors, windows, other building components, laboratory casework, and other laboratory equipment. Indicate clearances from above items.

5. Include layout of fume hoods in relation to lighting fixtures and air-conditioning registers and grilles.
6. Include coordinated dimensions for laboratory equipment specified in other Sections.

D. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for fume hood exterior, cabinets, and each type of top material indicated.

E. Samples for Verification: 6-inch-square samples for each type of finish, including top material.

F. Product Test Reports: Based on evaluation of tests performed by manufacturer and witnessed by a qualified independent testing agency, indicate compliance of fume hoods with requirements based on comprehensive testing of hoods.

1.6 QUALITY ASSURANCE:

A. Source Limitations: Obtain laboratory fume hoods through one source from a single manufacturer.

B. Fume Hood Standard: Provide fume hoods complying with the requirements of SEFA 1.1, "Laboratory Fume Hoods--Recommended Practices."

C. Safety Glass: Products complying with ANSI Z97.1 and testing requirements of 16 CFR, Part 1201 for Category II materials.

D. Handicapped Accessibility Requirements: Laboratory fume hoods shall be made accessible to handicapped persons, accordance with ANSI A117.1 and Section 504 of the Rehabilitation Act of 1973, as amended.

1.7 PRODUCT HANDLING:

A. Coordinate delivery of fume hoods with delivery of other laboratory casework components.

B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

1.8 COORDINATION:

A. Coordinate installation of fume hoods with laboratory casework, fume hood exhaust ducts, and plumbing and electrical work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Fisher Hamilton LLC
2. Kewaunee Scientific Corp.; Laboratory Division.
3. Labconco Corporation.
4. Air Masters Systems Corp.

2.2 MATERIALS:

A. Steel Sheet: Commercial-quality, cold-rolled, carbon-steel sheet, complying with ASTM A 366; matte finish; suitable for exposed applications; and stretcher leveled or roller leveled to stretcher-leveled flatness.

B. Stainless-Steel Sheet: ASTM A 666, Type 302 or 304, stretcher leveled, No. 4 finish.

C. Glass-Fiber-Reinforced Polyester: Polyester laminate complying with ASTM D 4357, with a chemical-resistant gel coat on the exposed face, and having a flame-spread index of 25 or less when tested according to ASTM E 84.

D. Epoxy: Factory-molded, modified, epoxy-resin formulation, uniform mixture throughout, full thickness with smooth, nonspecular finish.

1. Physical Properties: Comply with the following minimum requirements:

a. Flexural strength: 15,000 psi.
b. Compressive strength: 30,000 psi.
c. Hardness (Rockwell M): 100.
d. Water absorption (24 hours): 0.02 percent (maximum).
e. Heat distortion point: 350 deg F.
f. Thermal-shock resistance: Highly resistant.

2. Flame Spread: 25 or less per ASTM E 84.
3. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, test procedure 3.9.5:

a. Acetone: Moderate effect.
b. Acetic acid (98 percent): No effect.
c. Hydrochloric acid (37 percent): No effect.
d. Nitric acid (70 percent): No effect.
e. Phosphoric acid (85 percent): No effect.
f. Sulfuric acid (33 percent): No effect.
g. Benzene: No effect.

h. Butyl alcohol: No effect.
i. Carbon tetrachloride: No effect.
j. Ethyl acetate: No effect.
k. Ethyl ether: No effect.
l. Formaldehyde: No effect.
m. Phenol (85 percent): No effect.
n. Xylene: No effect.
o. Ammonium hydroxide (28 percent): No effect.
p. Sodium hydroxide (50 percent): Moderate effect.
q. Zinc chloride: No effect.

E. Tempered Glass: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality q3.

2.3 RESTRICTED BYPASS FUME HOODS:

A. Restricted-Bypass Fume Hoods: Provide restricted-bypass fume hoods. Partial compensating bypass above the sash opens after sash is closed to less than 20 percent open. Design partial bypass to maintain exhaust capacity of at least 25 cfm per sq. ft.127 L/s per sq. m of work surface regardless of sash position.

B. VAV Control: Equip fume hoods with an electronic control unit with a sensing device that monitors face velocity, and a motorized damper on the exhaust connection that maintains a constant face velocity by controlling air volume in response to control unit. Equip units with manual override switch that opens motorized damper to provide maximum exhaust capacity regardless of sash position.

1. Provide output transmitter on electronic control unit that produces zero- to 10-V dc signal proportional to fume hood exhaust volume for interface with building's HVAC control system.

C. Fume hoods shall be designed with ~~explosion-~~ vaporproof lighting fixtures and electrical systems in accordance with ~~NFPA 45~~ SEFA 1.

2.4 FABRICATION:

A. Hood Superstructure: Superstructure is constructed of 16 and 18ga. furniture grade, cold rolled steel.

1. Finish: Chemical resistant finish exterior.
2. Furnish closure panels to enclose void between fume hood to ceiling at all fume hoods. Closure panels finish shall match hood.

B. Molded Glass-Fiber-Reinforced Polyester Lining: Molded unit consisting of end panels, back panel, preset rear baffle, and top bonded together into a single piece and reinforced to form a rigid assembly to which exterior is attached.

1. Punch fume hood lining side panels to receive remote controls and service fittings as indicated. Furnish removable plug buttons for holes not used for indicated fittings.

C. Rear Baffle: Provide baffle, of same material as fume hood lining, at rear of hood with adjustable openings at top and bottom for adjustment of airflow through hood. Secure baffle to cleats at rear of hood with stainless-steel screws. Fabricate baffle for easy removal for cleaning behind baffle.

1. Provide control adjustment strips at top and bottom with plastic or stainless-steel knobs.

D. Exhaust Plenum: Full width of fume hood and with adequate volume to provide uniform airflow from hood, of same material as hood lining.

1. Provide stainless-steel, epoxy-coated steel, or glass-fiber-reinforced polyester duct stub for exhaust connection.

E. Sash: Vertical sliding sash, counterbalanced with weights on Monel metal cables, operating on ball-bearing nylon pulleys. Sash frames are 2 inches by 16 gauge powder coated steel and glazed with 1/4 inch thick, laminated safety glass. The sash has routed finger lifts and rubber bumpers provided.

F. Lights: Provide a vaporproof, 2-tube, rapid-start, fluorescent light fixture, of longest practicable length, complete with tubes at each fume hood. Shield tubes from hood interior by 1/4-inch-thick laminated glass or 3-mm-thick tempered glass, sealed into hood with chemical-resistant rubber gaskets. Set units so fluorescent tubes are easily replaceable from outside of hood.

G. Countertop: Unless otherwise indicated, provide countertops and cup sink as follows:

1. Epoxy Tops: Fabricate with front overhang of 1 inch over base cabinets, formed with continuous drip groove on underside ½ inch from edge.

a. Top Configuration: Flat, with square edges.
b. Top Thickness: 1 inch.

H. Controls: Operable parts, switches shall be placed below 48-inches above finish floor.

2.5 CHEMICAL-RESISTANT FINISH:

A. General: Prepare, treat, and finish welded assemblies after welding. Prepare, treat, and finish components that are to be assembled with mechanical fasteners before assembling. Prepare, treat, and finish concealed surfaces same as exposed surfaces.

B. Preparation: Clean steel surfaces, other than stainless steel, of mill scale, rust, oil, and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it.

C. Chemical-Resistant Finish: Immediately after cleaning and pretreating, apply fume hood manufacturer's standard two-coat, chemical-resistant, baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils0.05 mm.

1. Chemical and Physical Resistance of Finish System: Finish complies with acceptance levels of cabinet surface finish tests in SEFA 8. Acceptance level for chemical spot test shall be no more than four Level 3 conditions.
2. Colors for Fume Hood Finish: As selected by Architect from manufacturer's full range.

2.6 ACCESSORIES:

A. Airflow Indicator and Alarm: Provide each fume hood with manufacturer's standard airflow indicator with audible and visual alarm that activates when airflow sensor reading is outside of preset range.

B. Airflow Indicator: Provide each fume hood with airflow indicator of[**one of**] the following type(s):

1. Indicator Type: Direct-reading aneroid (Magnehelic-type) gage that measures exhaust duct static pressure of fume hood as an indication of airflow.
2. Indicator Type: Thermal anemometer that measures fume hood face velocity and indicates whether it is below normal, normal, or above normal.
3. Indicator Type: Thermal anemometer that measures fume hood face velocity and displays data as digital readout.

C. Airflow Alarm: Provide fume hoods with audible and visual alarm that activates when airflow sensor reading is outside of preset range.

1. Provide with thermal-anemometer or aneroid (Magnehelic-type) gage airflow sensor.
2. Provide with reset and test switches.
3. Provide with switch that silences audible alarm and automatically resets when airflow returns to within preset range.

D. Service Fittings: Comply with requirements of Division 12 Section "Wood Laboratory Casework."

1. Provide service fittings with exposed surfaces, including fittings, escutcheons, and trim, finished with acid- and solvent-resistant, baked-on plastic coating in manufacturer's standard metallic brown, aluminum, or other color as approved by Architect.
2. Provide service fittings with parts exposed within fume hoods made from polyvinylidene fluoride.
3. Provide service fittings complying with either of the above.

E. Provide the following equipment:

1. One duplex G.F.I. AC receptacle with a brown nylon face and a LED indicator light.

a. G.F.I. fixtures shall conform to UL Standard 943 Class A, and have dual slot terminal screw wiring connections and a trip time of 0.025 seconds.

F. Handles: Provide forged-brass lever handles for water valves, faucets, handles, and ground-key cocks that comply with handicapped requirements for controls and operating mechanisms. The force required to activate controls shall be no greater than 5 lbf.

G. Front and Side Ceiling Enclosure Kits: Provide white, epoxy coated steel enclosure panels, extending above the top of the front of the hood to the ceiling to hide exposed ductwork and wiring.

2.7 SOURCE QUALITY CONTROL:

A. Demonstrate fume hood performance before shipment by testing according to ASHRAE 110. Provide testing facility, instruments, equipment, and materials needed for tests.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. General: Install fume hoods according to Shop Drawings and manufacturer's written instructions. Install plumb, level, aligned, and securely anchored to building and adjacent laboratory casework. Securely attach access panels but provide for easy removal and secure reattachment. Where hoods abut other finished work, apply filler strips and scribe for accurate fit with fasteners concealed where practical.

B. Comply with requirements of Division 22 and 26 Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring. Install according to Shop Drawings and manufacturer's written instructions. Securely anchor fittings, piping, and conduit to fume hoods and casework, unless otherwise indicated.

3.2 FIELD QUALITY CONTROL:

A. Field test hoods according to ASHRAE 110 after completing installation to verify performance.

1. Adjust fume hoods, hood exhaust fans, and building's HVAC system, or replace hoods and make other corrections until tested hoods perform as specified.
2. After making corrections, retest fume hoods that failed to perform as specified.

3.3 ADJUSTING AND CLEANING:

A. Adjust moving parts for smooth, near-silent, accurate sash operation with one hand. Adjust sashes for uniform contact of rubber bumpers. Verify that counterbalances operate without interference.

B. Repair or remove and replace defective work as directed on completion of installation.

C. Clean finished surfaces, including both sides of glass; touch up as required; and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

3.4 FUME HOOD SCHEDULE:

A. Double Sided Bench-Top Fume Hood Type[**FH-2**]:

1. Basis-of-Design Product: Subject to compliance with requirements, provide **113400002, Restricted By-Pass, double-sided; Labconco** or a comparable product by one of the other listed manufacturers.

    a. Work Surface Height: 34 inches.
    b. Fume Hood Width: 4'-0"
    c. CFM/SP @ 100 FPM: 470/.15.
    d. ADA compliant.
    e. Air Alert Alarm.
    f. Left/right window: Not required.
    g. 4005200 Oval Polypropylene Cupsink.
    h. Hood Monitor: TEL AFA 500 MK3 Fume Hood Monitor.
    i. L611VB-BH laboratory single faucet, deck mounted, wrist blade handle.
        1) L4285B Remote control laboratory ball valve with guide plate, rod and handle for water and gas services.
    j. L4200-132SWSA laboratory ball gas valve assembly, deck mounted at 180 degrees, with wrist blade handle.
        1) L4285B Remote control laboratory ball valve with guide plate, rod and handle for water and gas services.
    k. Pre-wired T8 fluorescent lighting with vapor-proof design, one on each side and ADA-compliant light and blower switches on the front side.
    l. 115 vac, duplex outlet.

END OF SECTION 115313

SECTION 123553 LABORATORY CASEWORK

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. Wood laboratory casework.
2. Utility-space framing at backs of base cabinets and between backs of base cabinets.
3. Filler and closure panels.
4. Laboratory casework system that includes support and utility-space framing, filler and closure panels, and wall panels.
5. Laboratory countertops.
6. Tables.
7. Laboratory sinks.
8. Laboratory accessories.
9. Water, laboratory gas, and electrical service fittings.

B. Related Sections include the following:

1. Section 018113 “Sustainable Design Requirements.”
2. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking for anchoring laboratory casework.
3. Division 06 Section "Interior Architectural Woodwork" for requirements for plastic laminate interior architectural woodwork.
4. Division 09 Section "Resilient Wall Base and Accessories" for resilient base applied to wood laboratory casework.
5. Division 11 Section "Laboratory Fume Hoods" for fume hoods.
6. Division 22 and 26 Sections for installing service fittings specified in this Section.
7. Division 22 and 26 Sections for connecting service utilities at indicated point. Piping and wiring for service fittings within casework up to point of connection are specified in this Section.

1.3 DEFINITIONS:

A. Exposed Portions of Casework: Surfaces visible when doors and drawers are closed, including bottoms of cabinets more than 48 inches above floor, and visible surfaces in open cabinets or behind glass doors.

1. Ends of cabinets, including those installed directly against walls or other cabinets, shall be considered exposed.

B. Semiexposed Portions of Casework: Surfaces behind opaque doors, such as interiors of cabinets, shelves, dividers, interiors and sides of drawers, and interior faces of doors. Tops of cases 78 inches or more above floor are defined as semiexposed.

C. Concealed portions of casework include sleepers, web frames, dust panels, and other surfaces not usually visible after installation.

1.4 SUBMITTALS:

A. Product Data: For each type of product specified.

B. Sustainable Design Submittals:

1. A completed Green Building Materials Form, per Section 018113 – Sustainable Design Requirements: Information to be supplied includes:
2. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
3. Product Certificates: For regional materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each regional material.
4. Certified Wood: Wood products shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-00 and FSC STD
5. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
6. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
7. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
8. Product Data: For composite wood products, indicating that product contains no added urea formaldehyde.
9. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
10. Product Data: For installation adhesives, indicating VOC content.
11. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For wood laboratory casework. Include plans, elevations, sections, details, and attachments to other work.

1. Indicate locations of blocking and other supports required for installing casework.
2. Indicate locations and types of service fittings, together with associated service supply connection required.
3. Include details of utility spaces showing supports for conduits and piping.
4. Include details of exposed conduits, where required for service fittings.
5. Show adjacent walls, doors, windows, other building components, and other laboratory equipment. Indicate clearances from above items.
6. Include coordinated dimensions for laboratory equipment specified in other Sections.

D. Samples for Initial Selection: Manufacturer's color charts consisting of actual units or sections of units showing the full range of colors, textures, and patterns available for cabinets and each type of top material indicated.

E. Samples for Verification: As follows:

1. 6-inch- square samples for each type of top material.
2. One full-size, finished base cabinet complete with hardware, doors, and drawers, but without countertop.
3. One full-size, finished wall cabinet complete with hardware, doors, and adjustable shelves.
4. One sample each of hinged and sliding doors.
5. One of each service fitting specified, complete with accessories and specified finish.
6. One of each type of sink and accessory item specified.
7. Maintain Samples at Project site during construction in an undisturbed condition as a standard for judging the completed Work. Unless otherwise directed, approved Sample units in an undisturbed condition at the time of Substantial Completion may become part of the completed Work. Notify Architect of their exact locations. If not incorporated into the Work, retain acceptable Sample units at Project site and remove when directed by Architect.

F. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience.

G. Product Test Reports: Based on tests performed by a qualified independent testing agency, indicate compliance of laboratory casework finishes and countertops with requirements specified for chemical and physical resistance.

1.5 QUALITY ASSURANCE:

A. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated without delaying the Work, as documented according to ASTM E 548.

B. Source Limitations: Obtain laboratory casework, including tops, sinks, service fittings, and accessories, through one source from a single manufacturer.

C. Product Designations: Drawings indicate sizes, configurations, and finish material of casework by referencing designated manufacturer's catalog numbers. Other manufacturers' casework of similar sizes, similar door and drawer configurations, same finish material, and complying with the Specifications may be considered. Refer to Division 1 Section "Substitutions."

D. Building Performance Requirements:

1. Materials that contain recycled content shall be documented in accordance with the Building Submittal Requirements of this Section.
2. Steel materials used for work in this section shall contain a minimum of 35% (combined) pre-consumer/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Building Submittal Requirements of this Section.
3. Engineered wood, not including salvaged wood, shall contain a minimum of 10% (combined) pre-consumer/post-consumer recycled content (the percentage of recycled content is based on the weight of the component materials). Certification of recycled content shall be in accordance with the Building Submittal Requirements of this Section.
4. All composite wood, engineered wood, or agrifiber products (e.g., plywood, particleboard, medium density fiberboard) to be permanently installed on the interior of project shall contain no added urea-formaldehyde resins. Acceptable resins and binders include, but are not limited to, phenol formaldehyde and methyl diisocyanate (MDI). Certification of these products shall be in accordance with the Building Submittal Requirements of this Section.
5. Adhesives used for work in this section including plastic laminating adhesives shall contain no added Urea Formaldehyde.
6. Wood Materials manufactured, fabricated, and or harvested within 500 miles (by air) of the project site shall be documented in accordance with the Building Submittal Requirements of this Section.
7. Solid wood materials shall be FSC Certified as sustainably harvested by the Forest Stewardship Council Documentation of FSC Certification shall be in accordance with the Building Submittal requirements of this Section.
8. Adhesives, sealants, paints and coatings used for work in this section shall meet the requirements of Division 1, Section “Volatile Organic Compound (VOC) Limits for Adhesives, Sealants, Paints and Coatings”, where applicable. VOC Limits include, but are not limited to the following:

a.	Wood Flooring Adhesive	100 g/l
b.	Clear Wood Varnish	350 g/l
c.	Clear Wood Lacquer	550 g/
d.	Wood Stains	250 g/l
e.	Sanding Sealers	275 g/l
f.	Clear Shellac	730 g/l
g.	Pigmented Shellac	550 g/l

1.6 DELIVERY, STORAGE, AND HANDLING:

A. Do not deliver laboratory casework until painting, utility roughing-in, and similar operations that could damage, soil, or deteriorate casework have been completed in installation areas. If casework must be stored in other than installation areas, store only in areas whose environmental conditions meet requirements specified in "Project Conditions" Article below.

B. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with polyethylene film or other protective covering.

1.7 PROJECT CONDITIONS:

A. Environmental Limitations: Do not deliver or install laboratory casework until building is enclosed, wet-work is completed, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels through remainder of construction period.

1.8 COORDINATION:

A. Coordinate layout and installation of metal framing and reinforcement in gypsum board assemblies for support of wood laboratory casework.

1.9 EXTRA MATERIALS:

A. Furnish complete touchup kit for each type and finish of laboratory casework provided. Include scratch fillers, stains, finishes, and other materials necessary to perform permanent repairs to damaged casework finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Wood-Faced Laboratory Casework:

a. CIF Lab Solutions, distributed by Northeast Interior Systems, (401) 721-5600.
b. Hamilton Laboratory Solutions, tel:(920-657-1976.
c. Kewaunee Scientific Corp.; Laboratory Division, tel: (877)572-6610.
d. ICI Campbell Rhea, tel: (731) 642-4251.
e. New England Laboratory Casework Co., Inc., tel: (860) 871-9679
f. Sheldon Laboratory Systems, tel:(603) 432-0880.
g. Diversified Woodcrafts, Inc., tel: (877) 348-9663.

2. Products manufactured by Hamilton Laboratory Solutions are specified, unless otherwise noted. Items designated establish minimum requirements for design and performance of equipment required by this Section.
3. Epoxy Tops, Sinks and Troughs:

    a. Durcon Company, Inc. (The).
    b. Laboratory Tops, Inc.
    c. Or equal.

2.2 MATERIALS:

A. Exposed Materials: Comply with the following:

1. Exposed Wood: Do not use 2 adjacent exposed faces that are noticeably dissimilar in color, grain, figure, or natural character markings.

    a. Wood Species: White maple.
    b. Plain sliced veneer, (No heartwood), grade A. Book matched, running matched only.

2. Solid Wood: Clear hardwood lumber matching selected species, free of defects, selected for compatible grain and color and kiln dried to 7 percent moisture content.
3. Plywood: Hardwood plywood of species indicated, selected for compatible color and grain. HPVA HP-1, Grade AA faces at least 1/50 inch thick and Grade J crossbands. Edgeband exposed edges with minimum 1/8-inch-thick, solid-wood edging of the same species as face veneer.

B. Semiexposed Materials: Comply with the following:

1. Solid Wood: Sound hardwood lumber, selected to eliminate appearance defects and kiln dried to 7 percent moisture content. Any hardwood species similar in color and grain to exposed portions.
2. Plywood: Hardwood plywood of any species similar in color and grain to exposed portions. HPVA HP-1, Grade C faces and Grade J crossbands. Semiexposed backs of plywood with exposed faces shall be the same species as faces.

C. Concealed Materials: Comply with the following:

1. Solid Wood or Plywood: Any hardwood or softwood species, with no defects affecting strength or utility. Hardwood and softwood lumber kiln dried to 7 and 12 percent moisture content, respectively. Concealed backs of plywood with exposed or semiexposed faces shall be the same species as faces.
2. Particleboard: ANSI A208.1, Grade M-2.

D. All panels shall be manufactured without the use of added urea formaldehyde.

E. Acid Storage-Cabinet Lining: 1/4-inch-thick, polypropylene, epoxy, or phenolic-composite lining material.

F. Acid Storage Cabinet.

1. Unit designed to fit under countertop, into casework assemblies, or to be used as a stand alone unit. Constructed of 1" thick plywood finished in OSHA blue epoxy, corrosive resistant paint, and featuring two highly visible black and white safety decals on front. Cabinet is constructed to meet or exceed OSHA requirement for secondary containment. To eliminate hinge deterioration common in most acid storage cabinets, this unit is equipped with an all wooden hinge. Fixed shelf and floor are lined with polypropylene. Fixed shelf will accommodate 2.5 liter bottles, and the optional #8612 polypropylene isolation insert. Lower shelf holds 500ml. bottles only.

   a. Capacity: 22 gallons.
   b. Color: Blue.
   c. Quantity: 2 (two).
   d. Product: 8616 Acid Storage, Under-counter Cabinet; Lab Select; www.Campbellrhea.com

2.3 DESIGN, COLOR, AND FINISH:

A. Design: Provide wood laboratory casework of the following design:

1. Match Thermo Scientific Collegedale.
2. Reveal overlay.

B. Color and Finish: Comply with the following requirements for color and finish of wood laboratory casework:

1. Staining [**ST-1**]: Match Architect's sample. All exposed and semi-exposed surfaces shall be thoroughly stained in a manner which allows for a consistent application of the stain over all surfaces. The application shall ensure all areas are consistent and any visible splotchy areas are not allowed. The stain must be selected to meet the requirements of Green Seal GS-11 and all Connecticut High Performance requirements of the project, if so specified

2. Finish: Clear, catalyzed sealer, baked at 130 degree F., top coated with clear, catalyzed, conversion varnish, and then baked at 130 degrees F.

2.4 FABRICATION:

A. Construction: Provide wood-faced laboratory casework complying with SEFA 8 W, and of the following minimum construction:

1. Bottoms and ends of cabinets, shelves, and tops of wall cabinets and tall cabinets: 3/4-inch plywood.
2. Top frames of base cabinets: 3/4-by-2-inch solid wood with mortise and tenon or doweled connections, glued and pinned or screwed.

3. Backs of cabinets: 3/4-inch plywood where exposed, 1/4-inch hardboard dadoed into sides, bottoms, and tops where not exposed.
4. Drawer fronts: 3/4-inch plywood or solid hardwood.
5. Drawer sides and backs: 1/2-inch solid wood or 7/16-inch plywood, with glued dovetail joints.
6. Drawer bottoms: 1/4-inch hardboard glued and dadoed into front, back, and sides of drawers.
7. Doors 48 inches or less in height: 3/4 inch thick with solid hardwood stiles and rails, particleboard or medium-density fiberboard cores, and hardwood face veneers and crossbands.
8. Doors more than 48 inches in height: 1-1/16 inch thick with solid hardwood stiles and rails, honeycomb cores, and hardwood face veneers and crossbands.
9. Stiles and rails of glazed doors: 1-1/16-by-3-inch solid hardwood with mortise and tenon or doweled connections, glued and screwed.
10. Unexposed cabinet backs shall be 1/4 inch thick grade “B” plain sliced or rotary sap maple or white oak plywood. Cupboard, sink and fume hood units shall be provided with removable back panels allowing access to plumbing chase. Back panels in cupboards shall be removable without the use of hand tools or fasteners; sink and fume hood base cabinets shall be provided with 12 inch high removable back attached with 5/8 inch screws and washers. Backs are not provided for drawer bank cabinets. Backs behind solid panel doors shall be ¼” plywood and backs semi-exposed behind panel doors shall be ¼” plywood.
11. Cabinet backs exposed to view shall be ¾” rotary whole piece face white oak hardwood plywood.

B. Leg Shoes: Vinyl or rubber, black, open-bottom type.

C. Utility-Space Framing: Manufacturer's standard steel framing units consisting of 2 cold-rolled C-channel uprights, not less than 1-5/8 inches square by 0.10 inch thick, connected together at the top and bottom by U-shaped brackets made from 1-1/4-by-1/4-inch flat bars. Framing units may be made by welding C-channel material specified for uprights into rectangular frames instead of using U-shaped brackets.

D. Filler Strips: Provide as needed to close space between cabinets and walls, ceilings, and indicated equipment. Fabricate from the same material and with the same finish as cabinets.

E. Service Console Turrets: Cut outs for gas service outlets shall be diamond shaped to prevent turning. The service console shall be fixed to the epoxy top platform, bonded to the worktop in a manner which provides a moisture seal between worktop and console. Service turrets shall be fitted with gas taps routed to a single manifold.

1. GFI electrical outlets wired to a single junction box.

F. Special Fabrications:

1. Goggles Cabinet [**EQ-2**]:

a. Champbell Rhea Model #6784, or equal.
b. Capacity: 40 pairs, goggles/glasses.

c. Cabinet Size: 24-1/2" W x 32" H x 9-1/2" D
d. A sturdy, reinforced steel cabinet with baked white emamel finish and vandal resistant locking double doors. Equipped with eight (8) universal shelves that will hold either six (6), #6790 safety glasses or, five (5) #6786/#6788 goggles per shelf, for a total of 48 glasses or a total of 40 goggles (glasses and goggles are not included, order separately). A built-in germicidal lamp sanitizes the glasses/goggles between wearings, and is fully shielded from the front to prevent accidental exposure. An automatic 5 minute timer controls the sanitizing period. A seven and half foot long, three-wire grounded cord with plug is mounted on right end.
e. Quantity: As noted on the Drawings.

2. Epoxy Pegboards [**EQ-3**]:

a. Model #1193Q84: Size: 24 w- by 30 h-inches by 1-inch, 39 polypropylene pegs, with stainless steel drip trough; Thomas Scientific, or equal.
b. Quantity: As noted on the Drawings.

2.5 FINISH FOR WOOD LABORATORY CASEWORK:

A. Preparation: Machine sand lumber and plywood for casework construction before assembling. Sand edges of doors and drawer fronts and molded shapes with profile-edge sander. Hand sand casework after assembling for uniform smoothness at least equivalent to that produced by 220 grit sanding and without machine marks, cross sanding, or other surface blemishes.

B. Staining: Remove fibers and dust with compressed air or tack cloths and apply wash-coat sealer and stain to exposed and semiexposed surfaces as required to provide uniform, color-matching, approved samples.

C. Chemical-Resistant Finish: Apply manufacturer's standard 2-coat, chemical-resistant, baked, clear finish consisting of a thermosetting catalyzed sealer and a thermosetting catalyzed conversion varnish. Hand sand and wipe clean between applying sealer and topcoat. Topcoat may be omitted on fully concealed surfaces.

D. Chemical and Physical Resistance of Finish System: Provide wood laboratory casework with finish system complying with the following requirements for chemical and physical resistance:

1. High performance chemical resistant SEFA 8 finish.
2. Chemical Resistance: Capable of withstanding application of not less than 5 drops (0.25 mL) of the following reagents applied to finish surface; covered with a watch glass for 60 minutes, rinsed, and dried; with no permanent change in gloss, color, film hardness, adhesion, or film protection.

a. Acetic acid (98 percent).
b. Hydrochloric acid (37 percent).
c. Nitric acid (10 percent).
d. Phosphoric acid (75 percent).
e. Sulfuric acid (25 percent).
f. Acetone.

g. Benzene.
h. Carbon tetrachloride.
i. Ethyl acetate.
j. Ethyl alcohol.
k. Ethyl ether.
l. Formaldehyde (37 percent).
m. Methyl ethyl ketone.
n. Toluene.
o. Xylene.
p. Ammonium hydroxide (28 percent).
q. Potassium hydroxide (40 percent).
r. Sodium carbonate (saturated).
s. Sodium chloride (saturated).
t. Sodium hydroxide (25 percent)

3. Moisture Resistance: No visible effect when exposed to the following:

a. Hot water at a temperature of 190 to 205 deg F, trickled down the surface at a 45-degree angle for 5 minutes.
b. Constant moisture using a 2-by-3-by-1-inch cellulose sponge, soaked with water, in contact with surface for 100 hours.

2.6 CASEWORK HARDWARE:

A. Hardware, General: Provide manufacturer's standard satin-finish, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.

B. Hinges: Stainless-steel, 5-knuckle hinges complying with BHMA 156.9, Grade 1, with antifriction bearings and rounded tips. Provide 2 for doors less than 48 inches high and 3 for doors more than 48 inches high.

C. Pulls (Large Demonstration Tables): Solid aluminum rectangular style finger pulls, fastened from back with 2 screws. Provide 2 pulls for drawers more than 24 inches wide.

D. Pulls(Student Tables): Solid stainless steel fastened from back with 2 screws. Provide 2 pulls for drawers more than 24 inches wide.

E. Door Catches: Nylon-roller spring catch or dual, self-aligning, permanent magnet catch. Provide 2 catches on doors more than 48 inches high.

F. Drawer Slides: Metal-channel, self-closing drawer slides, designed to prevent rebound when drawers are closed, with nylon-tired, ball-bearing rollers, and complying with BHMA A156.9, Type B05091.

1. Capacity: 150 lb.

G. Label Holders: Stainless steel or chrome plated, sized to receive standard label cards approximately 1 by 2 inches, attached with screws or brads.

1. Provide on Large Demonstration Table.

H. Drawer and Cupboard Locks: Cylindrical type, 5-pin tumbler and cam, brass with chrome-plated finish, complying with BHMA A156.11, Grade 1.

1. Provide minimum of 2 keys per lock and 6 master keys.
2. Provide on all drawers and doors.

I. Adjustable Shelf Supports: Mortise-type steel standards and steel shelf rests, with epoxy powder-coated finish, complying with BHMA A156.9, Types B04071 and B04091.

J. Wall Shelves: Wood shelves fabricated from 1-inch solid hardwood, finished to match specified casework.

1. Wall Brackets and Standards: Fabricated from 12 ga. steel, painted.

2.7 TOPS, SINKS, AND TROUGHS:

A. Tops, General: Provide smooth, clean exposed tops and edges in uniform plane free of defects. Make exposed edges and corners uniformly beveled. Provide front and end overhang of 1 inch over base cabinets, formed with continuous drip groove on underside ½ inch from edge.

B. Sinks, General: Provide sizes indicated.

1. Outlets: 1-1/2-inch NPS outlets with strainers and tailpieces a minimum of 6 inches long, of the same material as sink, or as otherwise approved by Architect.
2. Pipe Insulation: Provide pipe insulation below sinks on ADA accessible units utilizing one of the following:

   a. TRUEBRO Insulation kit.
   b. McGuire Pro Wrap.
   c. Or equal.

3. Overflows: For each sink, except cup sinks, provide overflow of standard beehive or open-top design and with separate strainer. Height 2 inches less than sink depth. Provide in the same material as sink.

C. Epoxy Tops, Sinks, and Troughs: Factory molded of modified epoxy-resin formulation, uniform mixture throughout full thickness with smooth, nonspecular finish.

1. Physical Properties: Comply with the following minimum requirements:

   a. Flexural strength: 15,000 psi.
   b. Compressive strength: 30,000 psi.
   c. Hardness (Rockwell M): 100.

d. Water absorption (24 hours): 0.02 percent (maximum).
e. Heat distortion point: 350 deg F.
f. Thermal-shock resistance: Highly resistant.

2. Chemical Resistance: Epoxy-resin material has the following ratings when tested with indicated reagents according to NEMA LD 3, test procedure 3.9.5:

a. Acetone: Moderate effect.
b. Acetic acid (98 percent): No effect.
c. Hydrochloric acid (37 percent): No effect.
d. Nitric acid (70 percent): No effect.
e. Phosphoric acid (85 percent): No effect.
f. Sulfuric acid (33 percent): No effect.
g. Benzene: No effect.
h. Butyl alcohol: No effect.
i. Carbon tetrachloride: No effect.
j. Ethyl acetate: No effect.
k. Ethyl ether: No effect.
l. Formaldehyde: No effect.
m. Phenol (85 percent): No effect.
n. Xylene: No effect.
o. Ammonium hydroxide (28 percent): No effect.
p. Sodium hydroxide (50 percent): Moderate effect.
q. Zinc chloride: No effect.

3. Colors (**ER-1**): Provide products that result in colors complying with the following requirements:

a. Color: Graphite; Durcon.

4. Top Fabrication: Cast surfaces very smooth, with factory cutouts for sinks. Fabricate plain butt-type joints assembled with epoxy adhesive and prefitted, concealed metal splines.

a. Top Configuration: Marine edge and loose backsplash for field installation.
b. Top Thickness: 1 inch.

5. Sink Fabrication: Molded in one piece with surfaces smooth, corners coved, and bottom sloped to outlet; 1/2-inch minimum thickness.

a. Bond epoxy sinks installed in epoxy tops to tops and finish to produce an integral unit with invisible joint line.
b. Provide polypropylene sink outlet with disk strainer.
c. Provide removable epoxy resin sink covers at sinks.
d. Top of sink shall be flush with countertop when installed.

e. Epoxy Resin Sink ADA "**S-4**": Provide 18-inch long by 15-inch wide by 4.875- inch deep (inside), under-mount sink, with rear outlet drain; Durcon, Model #**A-25**, Drop-In Sink.

1) Provide right/rear or left/rear drain outlet. Reference Drawings for location.

f. Epoxy Resin Sink "**S-3**": Provide 18-inch long by 14-inch wide by 10.5-inch deep (inside), drop-in mount sink, center outlet drain, Durcon, Model #**D24C** Drop-In Sink or equal.

2.8 ACCESSORIES:

A. Rod Sockets: Stainless steel, tapered, flush socket receptacle.

2.9 WATER AND LABORATORY GAS SERVICE FITTINGS:

A. Service Fittings: Provide units that comply with SEFA 7, "Laboratory and Hospital Fixtures Recommended Practices." Provide fittings complete with washers, locknuts, nipples, and other installation accessories. Include wall and deck flanges, escutcheons, handle extension rods, and similar items.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Watersaver Vandal- Resistant Fixtures; Thermal Scientific, or comparable product by one of the following:

a. Broen Inc.; Distributed by Laboratory Enterprises, a Watts Water Technologies company.
b. Chicago Faucets; a Geberit company.
c. WaterSaver Faucet Company.
d. Or equal.

B. Handles: Provide forged-brass lever handles for water valves, faucets, handles, and ground-key cocks that comply with handicapped requirements for controls and operating mechanisms. The force required to activate controls shall be no greater than 5 lbf.

C. Material and Finish: Fabricate service fittings from cast or forged red brass, unless otherwise indicated.

1. Finish exposed surfaces, including fittings, escutcheons, and trim, with a polished chrome plating, unless otherwise indicated.

D. Water Valves and Faucets: Provide units complying with ASME A112.18.1M, with renewable seats, designed for working pressure up to 125 psig.

1. Vacuum Breakers: Provide vacuum breakers on water fittings with serrated outlets.
2. Aerators: Provide aerators on water fittings that do not have serrated outlets.
3. Provide with lever handles.
4. Single Valve Faucet: #32L21 series; Thermal Scientific

5. Mixing Faucet: #32L23200; Thermal Scientific.

E. Ground-Key Cocks: Tapered core and handle of one-piece forged brass, ground and lapped, held in place under constant spring pressure. Provide units designed for working pressure up to 40 psig. Provide with serrated outlets.

1. Provide with lever handles.
2. Double Service Valve: #30L241GO; Thermal Scientific.

F. Hand of Fittings: Furnish right-hand fittings unless fitting designation is followed by "L."

G. Remote-Control Valves: Provide needle valves, straight-through or angle type for fume hoods, handicapped work stations and where indicated.

H. Service-Outlet Identification: Provide color-coded plastic discs, with embossed identification, secured to each service-fitting handle to be virtually tamperproof.

2.10 ELECTRICAL SERVICE FITTINGS:

A. Service Fittings, General: Provide UL-labeled units complying with Division 16 Sections, complete with metal housings, receptacles, terminals, switches, pilot lights, device plates, and accessories and gaskets required for mounting on casework.

B. Receptacles: Provide Hospital Grade, 2-pole, 3-wire grounding devices rated at 20 A, 125 V, ac.

1. GFCI Receptacles: Provide ground-fault circuit interrupter duplex receptacles where indicated and when located in units containing water supplies or sinks.

C. Switches: Provide single-pole, double-pole, or 3-way switches, as required; rated 120 to 277 V, ac; and in amperage capacities to suit units served.

1. Provide pilot lights adjacent to toggle switch, where noted as "PL" next to switch identification.
2. Provide thermal-overload switches, single or double pole, as required, with maximum overcurrent trip setting to suit particular motor controlled.

D. Finishes for Service-Fitting Components: Furnish housings or boxes for pedestal- and line-type fittings with manufacturer's standard baked-on, chemical-resistant enamel in color as selected by Architect from manufacturer's full range of colors.

1. Provide ivory- or brown-colored receptacles and switches as selected by Architect.

E. Cover Plates: Provide satin finish, Type 302 or 304, stainless-steel cover plates with formed, beveled edges.

F. Cover-Plate Identification: Provide identification on cover plates at receptacles, switches, terminal posts, and other locations as indicated. Provide 1/4-inch-high letters, unless otherwise indicated.

1. Provide identification on the following devices whether indicated on Drawings or not:

a. Receptacles, other than standard 125-V duplex, grounding type. Indicate voltage and phase.
b. Switches and thermal-overload switches. Indicate equipment being controlled.
c. Pilot lights when located remotely from associated equipment or switch, where function is not obvious. Indicate equipment being controlled.

2. On stainless steel, stamp or etch directly on plate and fill in letters with black enamel.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcement, and other conditions affecting performance of wood laboratory casework installation.

1. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 CASEWORK INSTALLATION:

A. Install plumb, level, and true; shim as required, using concealed shims. Where laboratory casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical.

B. Utility-Space Framing: Secure to floor with 2 fasteners at each frame. Fasten to partition framing, wood blocking, or metal reinforcements in partitions and to base cabinets.

C. Base Cabinets: Set cabinets straight, plumb, and level. Adjust subtops within 1/16 inch of a single plane. Fasten cabinets to utility-space framing, partition framing, wood blocking, or reinforcements in partitions with fasteners spaced 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.

1. Where base cabinets are not installed adjacent to walls, fasten to floor at toe space with fasteners spaced 24 inches o.c. Secure sides of cabinets to floor, where they do not adjoin other cabinets, with not less than 2 fasteners.

D. Wall Cabinets: Hang cabinets straight, plumb, and level. Adjust fronts and bottoms within 1/16 inch of a single plane. Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through back, near top, at not less than 24 inches o.c. Align similar adjoining doors to a tolerance of 1/16 inch.

E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises, unless otherwise indicated. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.

F. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by manufacturer.

3.3 INSTALLATION OF TOPS:

A. Field Jointing: Where possible, make in the same manner as shop jointing using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project site processing of top and edge surfaces is not required. Locate field joints where shown on approved Shop Drawings.

B. Fastenings: Except for epoxy and phenolic-composite tops, use concealed clamping devices for field joints located within 6 inches of front, at back edges, and at intervals not exceeding 24 inches. Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

1. Secure epoxy tops to cabinets with epoxy cement, applied at each corner and along perimeter edges of not more than 48 inches o.c.

C. Abut top and edge surfaces in one true plane, with internal supports placed to prevent deflection. Provide flush hairline joints in tops using clamping devices.

1. Where necessary to penetrate tops with fasteners, countersink heads approximately 1/8 inch and plug hole flush with material equal to top in chemical resistance, hardness, and appearance.

D. Provide required holes and cutouts for service fittings.

E. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

F. Provide scribe moldings for closures at junctures of top, curb, and splash, with walls as recommended by manufacturer for materials involved. Match materials and finish to adjacent casework. Use chemical-resistant, permanently elastic sealing compound where recommended by manufacturer.

3.4 INSTALLATION OF SINKS:

A. Underside Installation of Epoxy Sinks: Use laboratory casework manufacturer's recommended adjustable support system for table- and cabinet-type installations. Set top edge of sink unit in sink and countertop manufacturers' recommended chemical-resistant sealing compound or adhesive and firmly secure to produce a tight and fully leakproof joint. Adjust sink and securely support to prevent movement. Remove excess sealant or adhesive while still wet and finish joint for neat appearance.

3.5 INSTALLATION OF ACCESSORIES:

A. Install accessories according to approved Shop Drawings and manufacturer's written instructions.

B. Securely fasten adjustable shelving supports, stainless-steel shelves, and pegboards to partition framing, wood blocking, or reinforcements in partitions.

C. Install shelf standards plumb and at heights to align shelf brackets for level shelves. Install shelving level and straight, closely fitted to other work where indicated.

3.6 INSTALLATION OF SERVICE FITTINGS:

A. Comply with requirements of Division 15 and 16 Sections for installing water and laboratory gas service fittings, piping, electrical devices, and wiring.

B. Install fittings according to approved Shop Drawings and manufacturer's written instructions. Bed bases and flanges of sink- and countertop-mounted fittings in sealant recommended by manufacturer of sink or countertop material. Securely anchor fittings, piping, and conduit to casework, unless otherwise indicated.

3.7 CLEANING AND PROTECTING:

A. Repair or remove and replace defective work as directed on completion of installation.

B. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish, as approved by Architect.

C. Protection: Provide 6-mil plastic or other suitable water-resistant covering over countertop surfaces. Tape to underside of countertop at minimum of 48 inches o.c.

3.8 SERVICE-FITTING SCHEDULE:

A. Water Service-Fitting: Provide faucet as follows:

1. Type of Fitting: Rigid, gooseneck, faucet.
2. Outlet: Vacuum breaker and removable serrated outlet.
3. Mounting: Deck mounted.

4. Application: Provide hot and cold water service fittings at each sink at each student work station.
5. Provide lever operated, remote-control valves for each ADA accessible work station.

B. Laboratory Gas Service-Fitting: Provide service fitting as follows for gas (G) service as noted on Plumbing Drawings:

1. Type of Fitting: Turret.
2. Outlets: 2, at 180 degrees.
3. Outlet Type: Straight.

4. Valve Type: Ground-key cock.
5. Applications: Provide two, double gas cocks at each student work station.
6. Provide lever operated, remote-control valves for each ADA accessible work station.

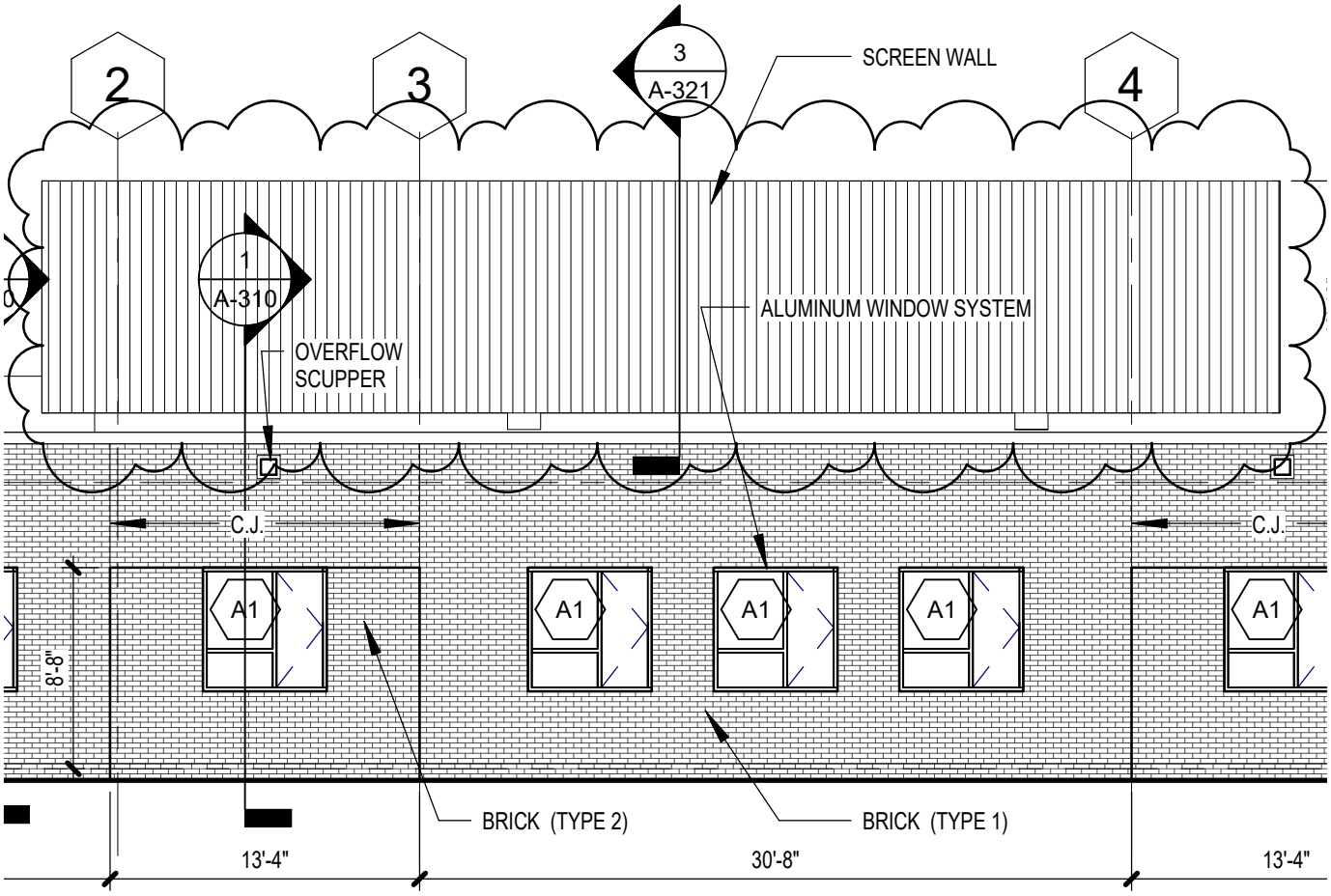
C. Electrical Service-Fitting: Provide receptacles, switches, and other devices as follows:

1. Type of Fitting: Recessed.
2. Device: One duplex GFCI receptacle.
3. Applications: Provide four, duplex GFCI receptacles at each student work station.

D. Rod Sockets: Provide rod sockets as follows:

1. Type of Fitting: Recessed.
2. Application: Provide four rod sockets at each student work station.

END OF SECTION 123553



3 WEST ELEVATION

1/8" = 1'-0"

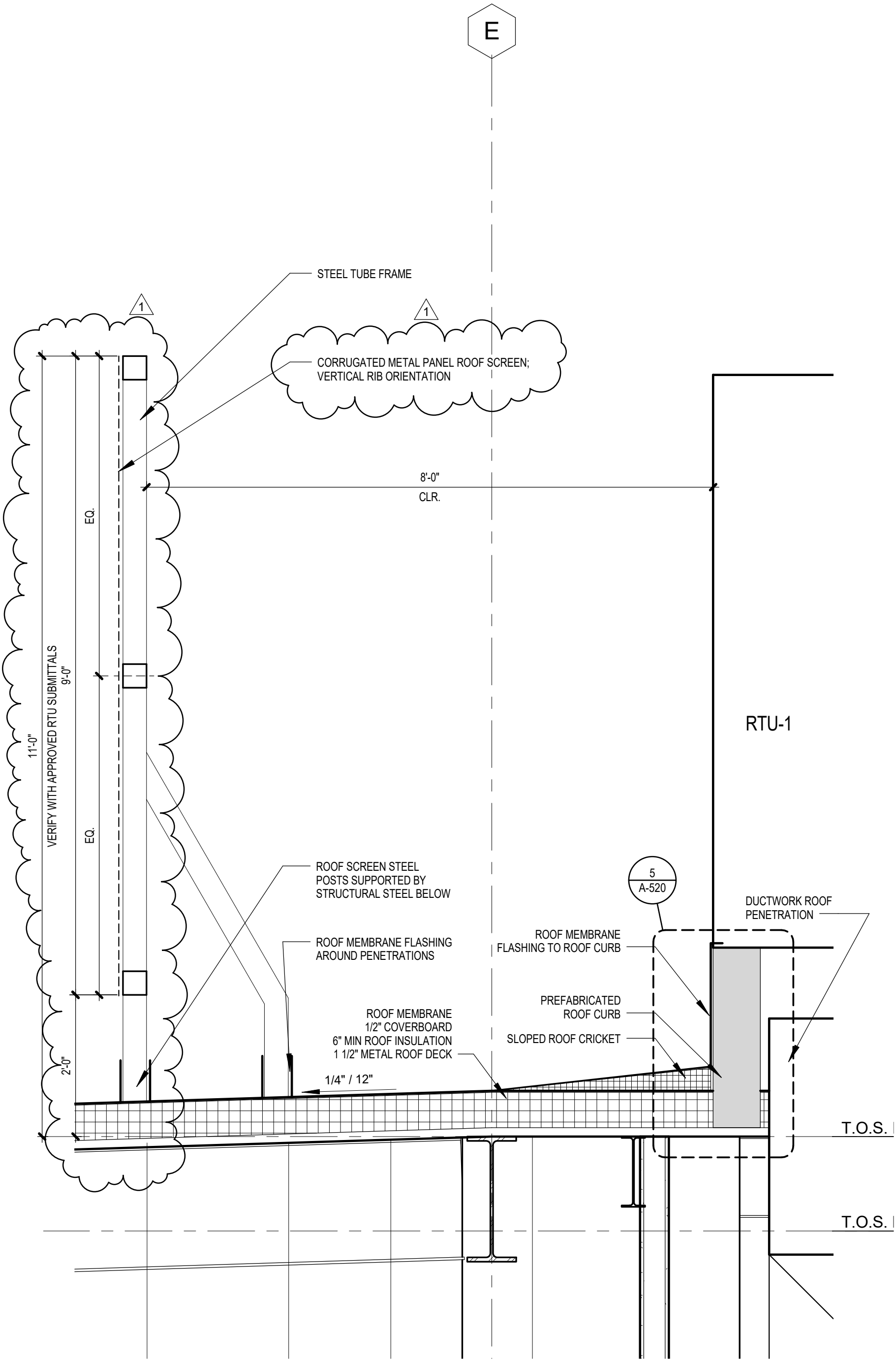
JCJARCHITECTURE
120 HUYSHOPE AVE SUITE 400
HARTFORD, CT 06106
860.247.9226

ADDENDUM 4

HALL HIGH SCHOOL SCIENCE CLASSROOMS

DRAWING REFERENCE:	A-201
DATE:	3/22/2018
PROJECT:	H16054.00
DRAWN:	KB
SCALE:	1/8" = 1'-0"

BSK-A10



120 HUYSHOPE AVE SUITE 400
HARTFORD, CT 06106
860.247.9226

ADDENDUM 4

HALL HIGH SCHOOL SCIENCE CLASSROOMS

DRAWING REFERENCE:	A-321
DATE:	3/22/2018
PROJECT:	H16054.00
DRAWN:	KB
SCALE:	3/4" = 1'-0"

BSK-A11

LIGHT FIXTURE SCHEDULE

TYPE	BASIS OF DESIGN DESCRIPTION, MANUFACTURER, AND MODEL #	LAMP	FIXTURE WATTS	VOLTS	REMARKS	COMPARABLE PRODUCTS
A	PENDANT MOUNTED LED FIXTURE, NUMBER INDICATES LENGTH OF FIXTURE AXIS MODEL # TBZDLED-500-400-80-35-SL-SO-XX-W-UNV-DP-1-XX	LED	9.6 WATTS PER FOOT	120	-	LUMATO MODEL # S3-XX-H1-64-XX-35-W-SD-0-10 IND FINELITE MODEL # HP-2-1D-XX-S-S-835-F-WSO-96LG-120V-SC-FA-FE
AE	PENDANT MOUNTED LED FIXTURE, NUMBER INDICATES LENGTH OF FIXTURE, WITH INTEGRAL BATTERY BACK UP AXIS MODEL # TBZDLED-500-400-80-35-SL-SO-XX-W-UNV-DP-1-XX-B#	LED	9.6 WATTS PER FOOT	120	-	LUMATO MODEL # S3-XX-H1-64-XX-35-W-SD-0-10 IND FINELITE MODEL # HP-2-1D-XX-S-S-835-F-WSO-96LG-120V-SC-FA-FE
B	2'W X 4'L RECESSED CEILING LED FIXTURE COLUMBIA LIGHTING MODEL # LCAT24-35MLG-R-EDU	LED	39 WATTS	120	-	LITE CONTROL MODEL #LHFL-GD24-SOF-C1-35K-D48-D05 DAY-BRITE MODEL # 2FGG48L835-4-D-UNV-DIM
BE	2'W X 4'L RECESSED CEILING LED FIXTURE, WITH INTEGRAL BATTERY BACK UP COLUMBIA LIGHTING MODEL # LCAT24-35MLG-R-EDU-ELL14	LED	39 WATTS	120	-	LITE CONTROL MODEL #LHFL-GD24-SOF-C1-35K-D48-D05 DAY-BRITE MODEL # 2FGG48L835-4-D-UNV-DIM-EMLED
B1	2'W X 4'L RECESSED CEILING LED FIXTURE COLUMBIA LIGHTING MODEL # LCAT24-35MWG-R-EDU	LED	30 WATTS	120	-	LITE CONTROL MODEL #LHFL-GD24-SOF-C1-35K-D48-D05 DAY-BRITE MODEL # 2FGG38L835-4-D-UNV-DIM
B1E	2'W X 4'L RECESSED CEILING LED FIXTURE, WITH INTEGRAL BATTERY BACK UP COLUMBIA LIGHTING MODEL # LCAT24-35MWG-R-EDU-ELL14	LED	30 WATTS	120	-	LITE CONTROL MODEL #LHFL-GD24-SOF-C1-35K-D48-D05 DAY-BRITE MODEL # 2FGG38L835-4-D-UNV-DIM-EMLED
B2	2'W X 4'L RECESSED CEILING LED FIXTURE COLUMBIA LIGHTING MODEL # LCAT24-35MLG-R-EDU	LED	39 WATTS	277	-	LITE CONTROL MODEL #LHFL-GD24-SOF-C1-35K-D48-D05 DAY-BRITE MODEL # 2FGG48L835-4-D-UNV-DIM
B2E	2'W X 4'L RECESSED CEILING LED FIXTURE, WITH INTEGRAL BATTERY BACK UP COLUMBIA LIGHTING MODEL # LCAT24-35MLG-R-EDU-ELL14	LED	39 WATTS	277	-	LITE CONTROL MODEL #LHFL-GD24-SOF-C1-35K-D48-D05 DAY-BRITE MODEL # 2FGG48L835-4-D-UNV-DIM-EMLED
C	1'W X 4'L RECESSED CEILING LED FIXTURE COLUMBIA LIGHTING MODEL # LCAT14-35MLG-R-EDU	LED	38 WATTS	120	-	LITE CONTROL MODEL #LHFL-GD14-SOF-C1-35K-D45-D05 DAY-BRITE MODEL # 1FGG45L835-4-D-UNV-DIM
CE	1'W X 4'L RECESSED CEILING LED FIXTURE, WITH INTEGRAL BATTERY BACK UP COLUMBIA LIGHTING MODEL # LCAT14-35MLG-R-EDU-ELL14	LED	38 WATTS	120	-	LITE CONTROL MODEL #LHFL-GD14-SOF-C1-35K-D45-D05 DAY-BRITE MODEL # 1FGG45L835-4-D-UNV-DIM-EMLED
C1	1'W X 4'L SURFACE MOUNT LED FIXTURE COLUMBIA LIGHTING MODEL # LCAT14-35MLSM-R-EDU	LED	38 WATTS	120	-	LITE CONTROL MODEL #LHFL-GD14-SOF-C1-35K-D45-D05 DAY-BRITE MODEL # 1FGG45L835-4-D-UNV-DIM
C1E	1'W X 4'L SURFACE MOUNT LED FIXTURE, WITH INTEGRAL BATTERY BACK UP COLUMBIA LIGHTING MODEL # LCAT14-35MLSM-R-EDU-ELL14	LED	38 WATTS	120	-	LITE CONTROL MODEL #LHFL-GD14-SOF-C1-35K-D45-D05 DAY-BRITE MODEL # 1FGG45L835-4-D-UNV-DIM-EMLED
D	4" RECESSED LED DOWNLIGHT PATHWAY MODEL # 4VLFLX110035KE1DE4/4VLEDHAZ	LED	15 WATTS	120	-	EDISON PRICE MODEL #FTD-4-4DL-7DAY-L11-35K-VOL LIGHTOLIER MODEL # P4RD10NZ10UVB-P4RD835VB-P4RDCC
DE	4" RECESSED LED DOWNLIGHT, WITH INTEGRAL BATTERY BACK UP PATHWAY MODEL # 4VLFLX110035KE1DE4/4VLEDHAZ-EM	LED	15 WATTS	120	-	EDISON PRICE MODEL #FTD-4-4DL-7DAY-L11-35K-VOL LIGHTOLIER MODEL # P4RD10NZ10UVBEM-P4RD835VB-P4RDCC
D1	4" RECESSED LED DOWNLIGHT PATHWAY MODEL # 4VLFLX110035KE2DE4/4VLEDHAZ	LED	15 WATTS	277	-	EDISON PRICE MODEL #FTD-4-4DL-7DAY-L11-35K-VOL LIGHTOLIER MODEL # P4RD10NZ10UVB-P4RD835VB-P4RDCC
E	NOT USED	-	-	-	-	-
F	2' DIA. APERTURE X 7 1/2"H RECESSED DOWNLIGHT, SPUN ALUMINUM PEWTER ALZAK REFLECTOR WITH AMERICAN MATTE FINISH AND WHITE TRIM PRESCOLITE #02LED-2D9LED-9L35K8MD25-MFC.	LED	17 WATTS	120	-	EDISON PRICE MODEL #WZ-CLT-DL-32-L12S-DMV-35K-LP-DHL-OL SPECTRUM LIGHTING MODEL # SR2MOXT10LDS101H12/ RD2F35KMDPTNL
G	RECESSED LED WALL SLOT FIXTURE, NUMBER INDICATES LENGTH OF FIXTURE AXIS MODEL # B3RLED-SL-500-90-35-FL-XX-W-120-D-1	LED	5.2 WATTS PER FOOT	120	-	FOCAL POINT MODEL #FSM4L-FL2-625LF-P35K-1C-UNV-LD1-X-WH-X FINELITE MODEL # HP-4 R-XX-B-835-F-120V-SC
H	UNDER CABINET LED LIGHT FIXTURE AIREY THOMPSON MODEL #13L-N-35K-XX-2-3	LED	4.6 WATTS PER FOOT	120	-	DIODE LED MODEL #DI-120V-SABER-PD35-XX-WH SERIES CALI LIGHTING MODEL # ALS900TWHLED3.5K5W10VHOSF120V
J	SURFACE MOUNTED LED WRAP AROUND FIXTURE COLUMBIA MODEL # LCL435MLEU	LED	42 WATTS	120	-	LITHONIA MODEL #ZL1D-L48-SMR-5000LM-FST-MVOLT-35K-80CRI-WH DAY-BRITE MODEL # FSS455L835UNVDIM
JE	SURFACE MOUNTED LED WRAP AROUND FIXTURE, WITH INTEGRAL BATTERY BACK UP COLUMBIA MODEL # LCL435MLEUELL14	LED	42 WATTS	120	-	LITHONIA MODEL #ZL1D-L48-SMR-5000LM-FST-MVOLT-35K-80CRI-WH DAY-BRITE MODEL # FSS455L835UNVDIMEMLED
K	RECESSED LED FIXTURE, NUMBER INDICATES LENGTH OF FIXTURE AXIS MODEL # B3RLED-SL-750-80-35-FL-XX-W-UNV-1-XX	LED	7.8 WATTS PER FOOT	277	-	LUMATA MODEL #R3-XX-H1-01-35-XX-W-SD-0-10 FINELITE MODEL # HP-4 R-XX-H-835-F-277V-SC
KE	RECESSED LED FIXTURE, NUMBER INDICATES LENGTH OF FIXTURE, WITH INTEGRAL BATTERY BACK UP AXIS MODEL # B3RLED-SL-750-80-35-FL-XX-W-UNV-1-XX-B#	LED	7.8 WATTS PER FOOT	277	-	LUMATA MODEL #R3-XX-H1-01-35-XX-W-SD-0-10 FINELITE MODEL # HP-4 R-XX-H-835-F-277V-SC
L	WALL MOUNTED EXTERIOR LED FIXTURE RAB LIGHTING MODEL # SLIM18N-D10	LED	18 WATTS	120	-	NO SUBSTITUTIONS
LE	WALL MOUNTED EXTERIOR LED FIXTURE WITH BATTERY PACK RAB LIGHTING MODEL # SLIM12N-D10	LED	12 WATTS	120	-	NO SUBSTITUTIONS
X	UNIVERSAL MOUNTED EXIT SIGN SIGNTEX MODEL # RPRBBXRWTW	LED	4 WATTS	120/277	-	ISOLITE MODEL #LPX-EM-RU-WW-UN EVENLITE MODEL # TLA6-EM-R-X-W
X1	UNIVERSAL MOUNTED EXIT SIGN WITH HANDICAP ACCESSIBLE SYMBOL SIGNTEX MODEL # RAE BB X R W W XX TW	LED	5 WATTS	120/277	-	ISOLITE MODEL #LPX-CT-EM-RU-WW-UN EVENLITE MODEL # TLA-EMR-X-W
SA1	20.028" SQ. X 3.37" H HIGH OUTPUT LED POLE TOP AREA FIXTURE WITH DIE-CAST ALUMINUM HOUSING (BRONZE FINISH), VACUUM METALIZED POLYCARBONATE REFLECTOR, CLEAR POLYCARBONATE LENS, TYPE 5 DISTRIBUTION OPTICS, LIGHTCLOUD WIRELESS LIGHTING CONTROL SYSTEM, AND DIMMING LED DRIVER (120-277V). PROVIDE WITH 4" SQ. X 12"H STRAIGHT STEEL POLE (BRONZE FINISH). RAB LIGHTING #ALEDSS78ND10/LC WITH POLE #PS4-11-12WT.	LED	78 WATTS	120/277	-	NO SUBSTITUTIONS

ELECTRICAL DRAWING LEGEND

SYMBOLS

- RECESSED LED LIGHT FIXTURE, FIXTURE TYPE AS DESIGNATED.
- RECESSED LED LIGHT FIXTURE WITH INTEGRAL EMERGECNY BATTERY PACK, FIXTURE TYPE AS DESIGNATED.
- PENDENT MOUNT, WALL MOUNTED OR RECESSED LED LINEAR LIGHT FIXTURE, FIXTURE TYPE AS DESIGNATED.
- PENDENT MOUNT, WALL MOUNTED OR RECESSED LED LINEAR LIGHT FIXTURE WITH INTEGRAL EMERGECNY BATTERY PACK FIXTURE TYPE AS DESIGNATED.
- RECESSED LED LINEAR LIGHT FIXTURE, FIXTURE TYPE AS DESIGNATED.
- RECESSED LED LINEAR LIGHT FIXTURE WITH INTEGRAL EMERGECNY BATTERY PACK, FIXTURE TYPE AS DESIGNATED.
- LED WRAP AROUND LIGHT FIXTURE, FIXTURE TYPE AS DESIGNATED.
- LED WRAP AROUND LIGHT FIXTURE WITH INTEGRAL EMERGECNY BATTERY PACK, FIXTURE TYPE AS DESIGNATED.
- LED DOWN LIGHT FIXTURE, TYPE AS DESIGNATED.
- LED DOWN LIGHT FIXTURE WITH INTEGRAL EMERGECNY BATTERY PACK, FIXTURE TYPE AS DESIGNATED.
- EXTERIOR WALL MOUNT LED LIGHT FIXTURE, FIXTURE TYPE AS DESIGNATED.
- EXTERIOR WALL MOUNT LED LIGHT FIXTURE WITH INTEGRAL EMERGECNY BATTERY PACK, FIXTURE TYPE AS DESIGNATED.
- SELF-CONTAINED UNIVERSAL MOUNT LED EXIT SIGN LIGHT FIXTURE, TYPE AS DESIGNATED.
- SITE LED POLE MOUNTED LIGHT FIXTURE
- S — SINGLE POLE TOGGLE SWITCH, 48" AFF UNLESS NOTED DIFFERENTLY.
- S_3 — THREE WAY TOGGLE SWITCH, 48" AFF UNLESS NOTED DIFFERENTLY.
- S_{03} — LINE VOLTAGE WALL THREE WAY WALL SWITCH OCCUPANCY SENSOR, 48" AFF UNLESS NOTED DIFFERENTLY.
- S_{OC} — LINE VOLTAGE WALL SWITCH OCCUPANCY SENSOR, 48"AFF UNLESS NOTED DIFFERENTLY.
- PP — STAND ALONE OCCUPANCY SENSOR POWER PACK WITH INTEGRAL RELAYS.
- CEILING MOUNT OCCUPANCY SENSOR.
- DS — CEILING MOUNT DAYLIGHT SENSOR.
- PC — PHOTOCELL.
- NX — ROOM CONTROLLER SELF CONTAINED INTELLIGENT DEVICE.
- CS — LIGHTING CONTROL STATION 48" AFF UNLESS NOTED DIFFERENTLY.
- ES — LIGHTING ENTRY STATION 48" AFF UNLESS NOTED DIFFERENTLY.
- PANELBOARD
- BRANCH CIRCUIT WIRING. CROSS LINES INDICATE NUMBER OF CONDUCTORS.
- BRANCH CIRCUIT HOMERUN IN CONDUIT. CROSS LINES INDICATE NUMBER OF CONDUCTORS.
- GROUND.
- GW — GROUND WELL.
- UTILITY METER.
- J — JUNCTION BOX.
- DISCONNECT SWITCH.
- FUSED DISCONNECT SWITCH.
- VFD — VARIABLE FREQUENCY DRIVE.
- T — TRANSFORMER.
- MOTOR POWER CONECTION, EQUIPMENT AS DESIGNATED.
- SPECIAL EQUIPMENT POWER CONNECTION, EQUIPMENT AS DESIGNATED.
- DUPLEX RECEPTACLE, 18" AFF UNLESS NOTED DIFFERENTLY.
- DOUBLE DUPLEX RECEPTACLE, 18" AFF UNLESS NOTED DIFFERENTLY.
- EPO — MOMENTARY CONTACT MUSHROOM HEAD PUSH BUTTON SWITCH, 48" AFF
- MEGSO — GAS SHUT-OFF MASTER CONTROL STATION, 48" AFF
- G — EXISTING EMERGENCY SHUT OFF SWITCH.
- KG — EXISTING KEYED EMERGENCY SHUT OFF SWITCH.
- WAP — WIRELESS ACCESS POINT, CEILING MOUNT
- FLVP — FUTURE LOW VIDEO PRESENTATION OUTLET. SEE TECHNOLOGY DRAWINGS FOR ADDITIONAL INFORMATION
- PDC — PANEL DISPLAY CONNECTION OUTLET. SEE TECHNOLOGY DRAWINGS FOR ADDITIONAL INFORMATION
- DATA/VOICE OUTLET, 18" AFF UNLESS NOTED DIFFERENTLY.
- D# — DATA OUTLET. # INDICATES NUMBER OF JACKS. 18"AFF UNLESS NOTED DIFFERENTLY
- W — WALL VOICE OUTLET, 48"AFF UNLESS NOTED DIFFERENTLY
- 1 — B — DOUBLE GANG BACK BOX AND COVER PLATE WINYLOY PULL CORD FOR FUTURE CONTROL SYSTEM. 42"AFF TO CENTERLINE
- F — MANUAL PULL STATION, 48" AFF.
- S — SMOKE DETECTOR.
- S_D — DUCT SMOKE DETECTOR.
- M — MAGNETIC DOOR HOLDER.
- #cd — STROBE, 90" AFF UNLESS NOTED DIFFERENTLY. NUMBER INDICATES CANDELA.
- #cd — SPEAKER/STROBE, 90" AFF UNLESS NOTED DIFFERENTLY. NUMBER INDICATES CANDELA.
- H #cd — HORN/STROBE, 90" AFF UNLESS NOTED DIFFERENTLY. NUMBER INDICATES CANDELA.
- FACP — FIRE ALARM CONTROL PANEL.
- FARA — FIRE ALARM REMOTE ANNUNCIATOR.
- TP — TRANSPONDER PANEL
- CM — CONTROL MODULE. MOUNT ABOVE CEILING OR IN LOCAL CLOSET.
- MM — MONITOR MODULE. MOUNT ABOVE CEILING OR IN LOCAL CLOSET.
- R — FIRE ALARM RELAY, MOUNT ABOVE CEILING OR IN LOCAL CLOSET.
- RTS — DUCT SMOKE DETECTOR REMOTE TEST SWITCH.
- FIRE PROTECTION SYSTEM ELECTRIC BELL.
- TS — TAMPER SWITCH.
- FS — FLOW SWITCH.
- PS — POWER SUPPLY FOR DOOR LOCKING DEVICE AND REQUEST TO EXIT MOTION SENSOR.
- B — EXISTING SCHOOL BELL.
- GVRP — GAS VALVE RELAY PANEL.
- S — NORMALLY CLOSED/POWERED OPEN SOLENOID VALVE.

ABBREVIATIONS

A	AMPS.
AC	ABOVE COUNTER.
AFF	ABOVE FINISHED FLOOR (CENTERLINE OF DEVICE OR EQUIPMENT).
AT	AIR TERMINAL.
AWG	AMERICAN WIRE GAUGE.
C	CONDUIT.
C/B	CIRCUIT BREAKER.
cd	CANDELA.
CP	CONDENSATE PUMP.
CUH	CABINET UNIT HEATER.
EF	EXHAUST FAN.
E.O.L.	END OF LINE RESISTOR
ETR	EXISTING TO REMAIN.
EWC	ELECTRIC WATER COOLER.
EX	EXISTING SITE LIGHT FIXTURE TO REMAIN
FACP	FIRE ALARM CONTROL PANEL.
GFCI	INDICATES DEVICE WITH INTEGRAL GROUND FAULT CIRCUIT INTERRUPTER.
GVRP	GAS VALVE RELAY PANEL
GND	GROUND.
GW	GROUND WELL.
HWG	HOT WATER GENERATOR.
JB	JUNCTION BOX.
KVA	KILOVOLT-AMPS.
KW	KILOWATT.
MTS	MANUAL TRANSFER SWITCH.
NAC	NOTIFICATION APPLIANCE CIRCUIT.
NC	NORMALLY CLOSED.
NEC	NATIONAL ELECTRICAL CODE.
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION.
NIC	NOT IN CONTRACT.
NL	NIGHT LIGHT.
NO	NORMALLY OPEN
NTS	NOT TO SCALE.
P	PUMP.
RL	RELOCATE.
RTAHU	ROOF TOP AIR HANDLING UNIT.
SPD	SURGE PROTECTIVE DEVICE
T	TRANSFORMER.
TP	TWISTED PAIR.
TSP	TWISTED SHEILDED PAIR.
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR.
UH	UNIT HEATER.
UL	UNDERWRITERS LABORATORY.
UPS	UNINTERRUPTABLE POWER SUPPLY.
V	VOLTS.
VAC	VOLTS ALTERNATING CURRENT.
VDC	VOLTS DIRECT CURRENT.
VFD	VARIABLE FREQUENCY DRIVE.
WP	WEATHER PROOF.
XFMR	TRANSFORMER.

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS | ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 217-7070

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Maczhi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Maczhi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

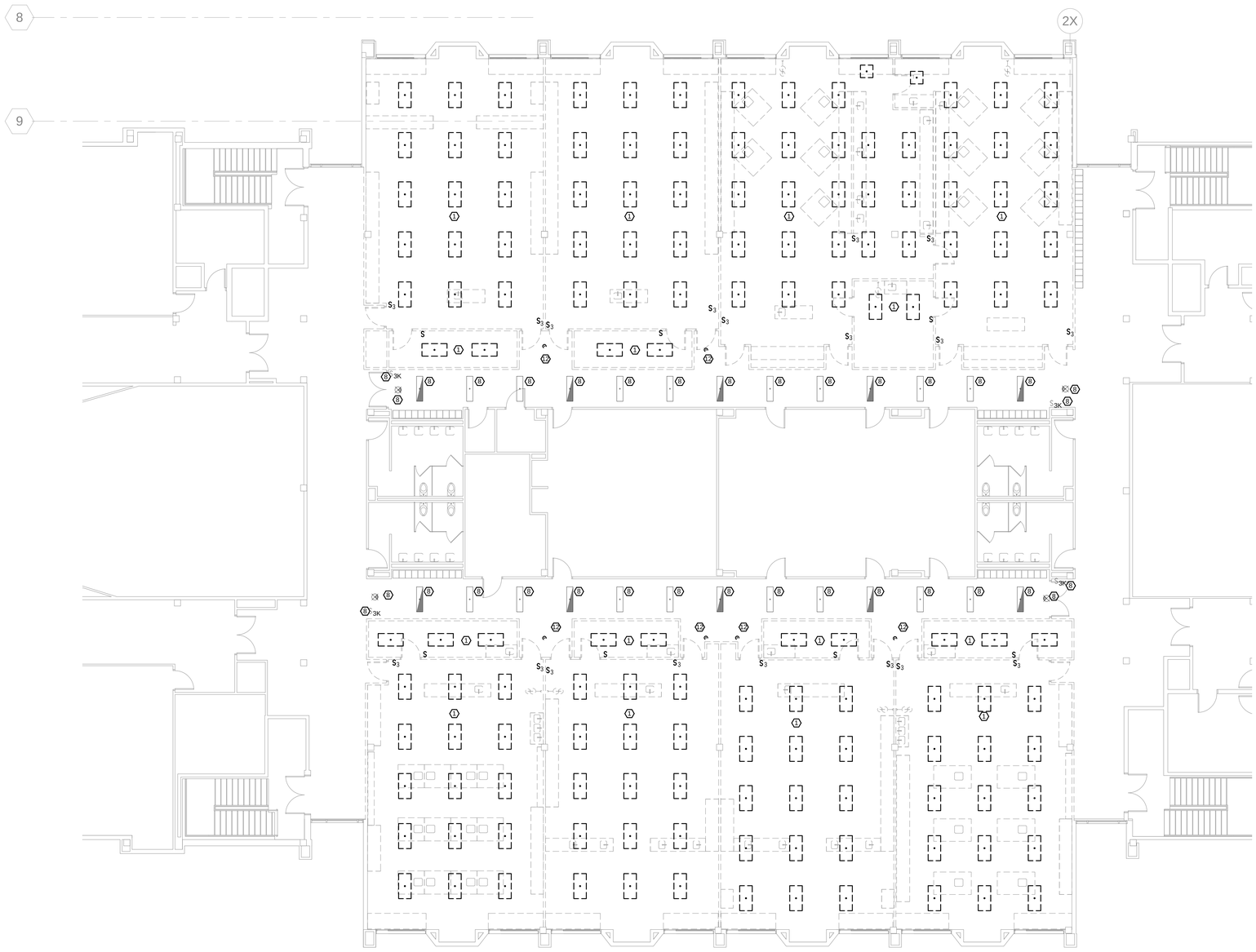
P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN P.A.M.
SCALE As indicated

REVISIONS:
1 3-19-2018 ADDENDUM 3

ELECTRICAL LEGEND AND LIGHT FIXTURE SCHEDULE

E-000



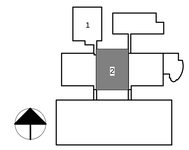
1 SECOND FLOOR - AREA 2 - LIGHTING DEMOLITION PLAN
ELD-112 1/8" = 1'-0"

DEMOLITION WORK NOTES

1. PRIOR TO SUBMITTING BID, VISIT THE SITE AND IDENTIFY EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT WORK TO BE PERFORMED. NO COMPENSATION WILL BE GRANTED FOR ADDITIONAL WORK CAUSED BY UNFAMILIARITY WITH SITE CONDITIONS THAT ARE VISIBLE OR READILY CONSTRUED BY EXPERIENCED OBSERVERS. INCLUDE IN THE BID ALL DEMOLITION WORK REQUIRED.
2. THE DEMOLITION DRAWINGS ARE INTENDED ONLY TO DEFINE THE GENERAL SCOPE OF DEMOLITION WORK AND TO ASSIST THE CONTRACTOR DURING BIDDING. THE DEMOLITION DRAWINGS MAY NOT SHOW EVERY ITEM WHICH MUST BE DISCONNECTED, REMOVED, OR RELOCATED IN ORDER TO FACILITATE NEW WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION WORK REQUIRED WHETHER OR NOT SHOWN ON THE PLANS.
3. DEMOLITION WORK SHALL BE COORDINATED WITH CONSTRUCTION PHASING SO THAT EXISTING PORTIONS OF THE BUILDING REMAIN FULLY ACTIVE AND FUNCTIONAL UP UNTIL THE TIME SUCH AREAS ARE TURNED OVER TO THE CONTRACTOR FOR RENOVATION WORK.
4. COORDINATE AND SCHEDULE ALL WORK WITH THE OWNER TO MINIMIZE INCONVENIENCE TO THE BUILDING OCCUPANTS. ALL SERVICES AND SYSTEMS SHALL BE MAINTAINED IN OPERATION DURING THE REGULAR SCHOOL DAY. ALL LIFE SAFETY SYSTEMS SHALL BE MAINTAINED IN FULLY OPERATIONAL CONDITION UNTIL THE NEW SYSTEMS HAVE BEEN INSTALLED, TESTED, AND APPROVED.
5. REMOVE AND/OR RELOCATE ALL EXISTING ELECTRICAL WORK AS NECESSARY FOR COORDINATION WITH THE WORK OF OTHER TRADES.
6. MECHANICAL EQUIPMENT SHALL BE REMOVED UNDER OTHER DIVISIONS OF THIS CONTRACT. EQUIPMENT SHALL BE DISONNECTED UNDER THIS DIVISION.
7. EXISTING ELECTRICAL EQUIPMENT, WIRING, AND RACEWAYS SHALL NOT BE REUSED UNLESS SPECIFICALLY NOTED OTHERWISE.
8. REMOVE ALL DEMOLITION MATERIAL FROM THE JOB SITE UNLESS THE OWNER WANTS TO RETAIN ANY SUCH MATERIAL FOR HIS USE. MATERIAL REQUESTED BY THE OWNER FOR SALVAGE SHALL BE DELIVERED TO THE OWNER'S DESIGNATED MATERIAL STORAGE AREA, ON SITE.
9. PROVIDE AND INSTALL BLANK STAINLESS STEEL COVER PLATES OVER ANY EXISTING FLUSH OUTLET BOXES WHICH ARE TO BE ABANDONED IN PLACE.
10. WHERE EXISTING WIRING TO REMAIN IS BURIED IN EXISTING WALLS OR CEILINGS NOT SCHEDULED FOR DEMOLITION, THE WIRING MAY BE DISCONNECTED, CUT BACK TO BELOW THE FINISHED SURFACE, AND LEFT IN PLACE. THE SURFACE OF THE EXISTING WALL OR CEILING SHALL THEN BE PATCHED AND REFINISHED TO MATCH THE ORIGINAL FINISH. WHERE EXISTING WIRING IS RUN BELOW FLOOR SLABS NOT SCHEDULED FOR DEMOLITION, THE WIRING SHALL BE DISCONNECTED AND REMOVED FROM IT'S RACEWAY. THE RACEWAY SHALL THEN BE CUT BACK TO BELOW THE FINISHED FLOOR SURFACE AND PLUGGED WITH CONCRETE. THE SURFACE OF THE EXISTING FLOOR SHALL THEN BE PATCHED AND REFINISHED TO MATCH THE ORIGINAL FINISH.
11. EXISTING LIGHT FIXTURES WHICH ARE FOUND TO CONTAIN PCB BALLASTS SHALL BE PROPERLY DISPOSED OF IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS. REMOVAL AND DISPOSAL OF PCB BALLASTS SHALL BE HANDLED BY THE HAZARDOUS MATERIAL ABATEMENT TRADE CONTRACTOR.
THE CONTRACTOR SHALL ASSUME THAT ALL LIGHTING BALLASTS CONTAIN POLYCHLORINATD BIPHENYLS (PCB'S) UNLESS THEY ARE CLEARLY LABELLED "NO PCB'S". THE CONTRACTOR SHALL COLLECT, PACKAGE, MANIFEST, AND TRANSPORT PCB BALLASTS TO A PERMITTED BALLAST RECYCLER IN ACCORDANCE WITH APPLICABLE OSHA, EPA, AND CONNECTICUT REGULATIONS. THE BALLAST RECYCLER SHALL RECYCLE, RECOVER, OR RECLAIM UNCONTAMINATED METAL BALLAST COMPONENTS. THE RECYCLER SHALL INCINERATE THE BALLAST CAPACITOR, ASPHALT POTTING MATERIAL, AND ANY COMPONENT CONTAINING 50 PARTS PER MILLION OR MORE PCB'S PURSUANT TO 40 CFR 761-70. THE CONTRACTOR SHALL PROVIDE TO THE OWNER THE WASTE MANIFESTS AND A CERTIFICATE OF DESTRUCTION PURSUANT TO 40 CFR 761 SUBPART K.
12. EXISTING FLUORESCENT LAMPS SHALL BE DISPOSED OF IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS FOR MERCURY DISPOSAL. LAMPS SHALL BE PLACED IN APPROVED CONTAINERS AND SHALL BE REMOVED FROM THE SITE FOR PROPER DISPOSAL. THE DISPOSAL CONTRACTOR SHALL BE FULLY INSURED AND SHALL ADHERE TO ALL FEDERAL, STATE AND LOCAL LAWS PERTAINING TO HANDLING AND DISPOSAL OF HAZARDOUS MATERIALS. THE REMOVAL SHALL BE HANDLED BY THE HAZARDOUS MATERIAL ABATEMENT TRADE CONTRACTOR.

ELECTRICAL DEMOLITION WORK NOTES

TAG	ACTION
1	DISCONNECT AND REMOVE EXISTING LIGHT FIXTURES, EXIT SIGNS, WALL SWITCHES, AND ALL ASSOCIATED WIRING. MAINTAIN EXISTING UNSWITCHES LIGHTING POWER CIRCUIT FOR NEW LIGHTING WITHIN ROOM.
2	DISCONNECT AND REMOVE EXISTING RECEPTACLES, WIREMOLD, DATA OUTLETS, TELEPHONE OUTLETS, AND GAS SHUT-OFF'S WITHIN ROOM. REMOVE ALL ASSOCIATED WIRING AND CONDUIT BACK TO POWER SOURCE OR LAST ACTIVE DEVICE.
3	DISCONNECT AND REMOVE EXISTING POWER CONNECTION TO UNIT VENTILATOR REMOVE ALL ASSOCIATED WIRING AND CONDUIT BACK TO THE PANELBOARD.
4	DISCONECT, REMOVE, REINSTALL AND RECONNECT EXISTING FIRE ALARM DEVICES AS REQUIRED FOR RENOVATIONS
5	EXISTING PANELBOARDS SHALL REMAIN.
6	MECHANICAL EQUIPMENT LOCATED IN CORRIDOR CEILING SHALL REMAIN ENERGIZED WHILE CONSTRUCTION IS IN PROGRESS UNLESS NOTED OTHERWISE.
7	ALL ELECTRICAL DEVICES LOCATED ON CORRIDOR WALLS NOT BEING DEMOLISHED SHALL REMAIN ENERGIZED WHILE CONSTRUCTION IS IN PROGRESS UNLESS NOTED OTHERWISE.
8	DISCONNECT AND MAKE SAFE ALL CIRCUITS. REMOVE EXISTING LIGHT FIXTURES AND EXIT SIGNS. STORE, CLEAN, AND RELAMP FOR REUSE IN NEW CEILING TILES. REUSE EXISTING CONDUIT, WIRING AND CIRCUITRY. REMOVE SWITCHES IN WALLS TO BE DEMOLISHED AND REPLACE WITH NEW IN SAME LOCATION IN NEW WALLS. REFER TO DRAWING EL-112 FOR ADDITIONAL INFORMATION
9	EXISTING MECHANICAL EQUIPMENT TO BE REMOVED. DISCONNECT AND REMOVE EXISTING DISCONNECT SWITCH. DISCONNECT AND REMOVE EXISTING BRANCH CIRCUIT WIRING AND CONDUIT BACK TO PANELBOARD.
10	DISCONNECT AND REMOVE EXISTING RECEPTACLE AND DATA JACK MAKE CIRCUIT SAFE AND KEEP CONTINUITY OF CIRCUITRY. REINSTALL DEVICES IN SAME LOCATION AFTER NEW WALL HAS BEEN CONSTRUCTED. CONNECT TO THE EXISTING CIRCUIT.
11	DISCONNECT AND REMOVE SPEAKER LOCATED ON EXISTING WALL TO BE DEMOLISHED.
12	DISCONNECT AND REMOVE DOWNLIGHTS STORE LIGHT FIXTURES, CLEAN AND REUSE IN CORRIDOR AS INDICATED. REFER TO DRAWING EL-112 FOR NEW LOCATION AND CIRCUITRY.



HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS | ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 227-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

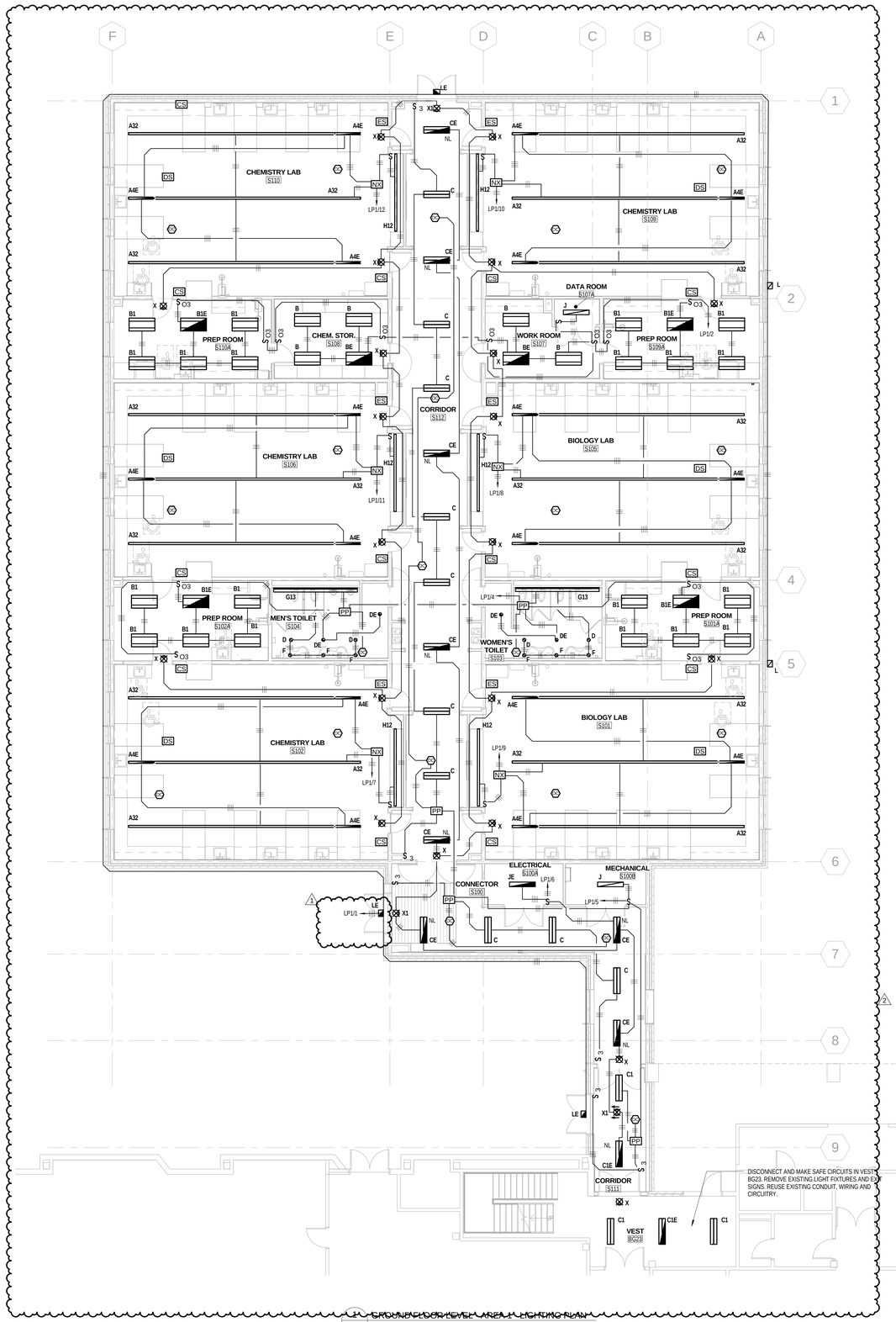
P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN P.A.M.
SCALE As indicated

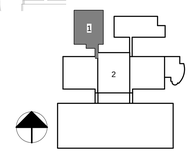
REVISIONS:

SECOND FLOOR AREA 2 LIGHTING DEMOLITION PLAN

ELD-112



1 GROUND FLOOR LEVEL AREA 1 LIGHTING PLAN
EL-111 1/8" = 1'-0"



HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 667-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

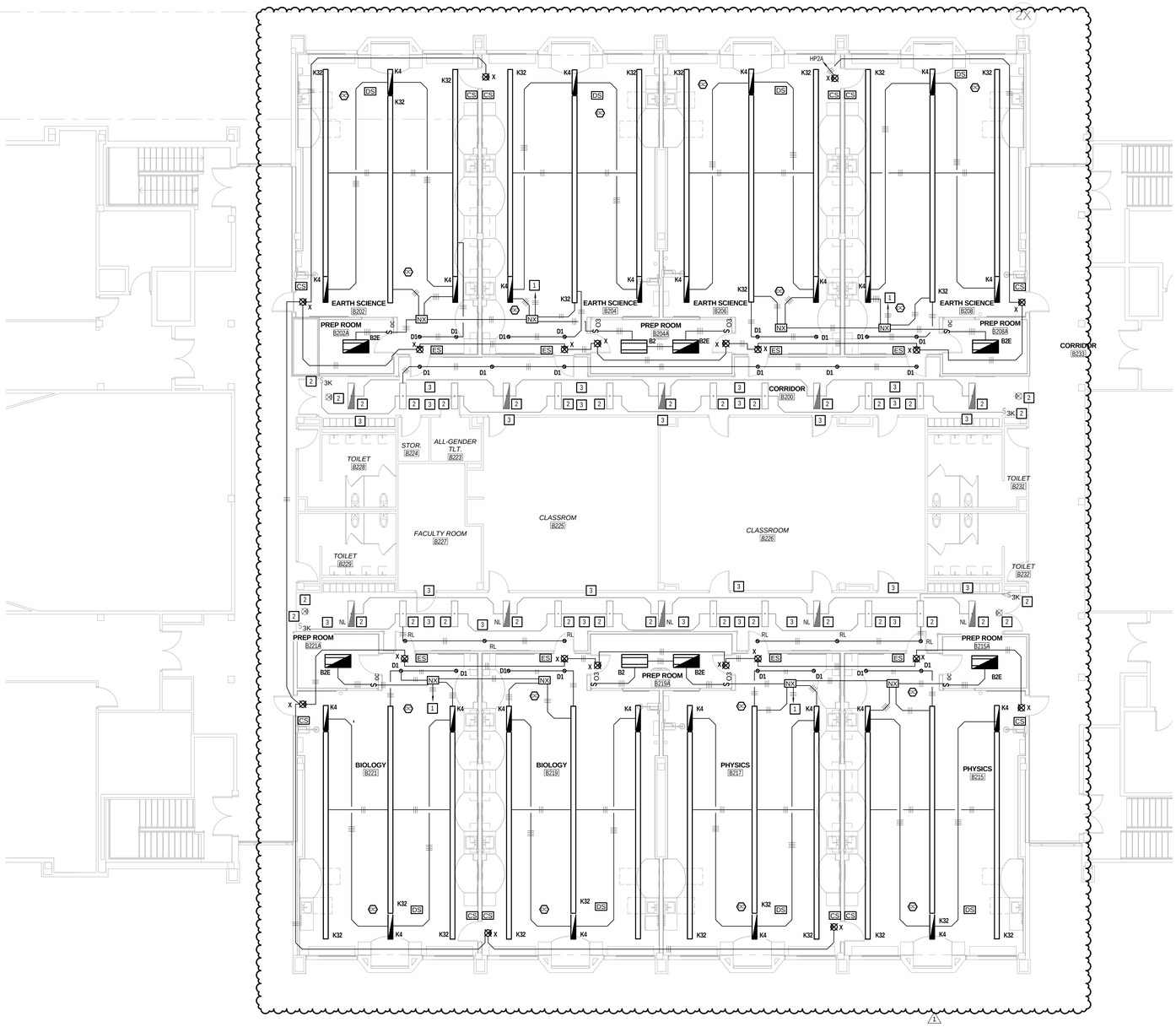
P.I.C. _____ L.D. _____
P.M. _____ P.A. _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN R.N.
SCALE 1/8" = 1'-0"

REVISIONS:
1. 3-19-2018 ADDENDUM 3
2. 3-22-2018 ADDENDUM 4

GROUND FLOOR AREA 1 LIGHTING PLAN

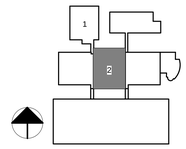
EL-111



1 SECOND FLOOR LEVEL - AREA 2 - LIGHTING PLAN
EL-112 1/8" = 1'-0"

ELECTRICAL LIGHTING WORK NOTES

TAG	ACTION
1	WIRE TO EXISTING LIGHTING CIRCUIT SERVING AREA
2	REINSTALL EXISTING LIGHT FIXTURES AND EXIT SIGNS IN NEW CEILING, REWIRE TO EXISTING CIRCUITRY AND SWITCHING. REPLACE EXISTING LIGHT SWITCH IN NEW NEW . PROVIDE NEW STAINLESS STEEL WALLPLATE.
3	EXISTING CORRIDOR WIRING SHOWN FOR REFERENCE ONLY



HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS | ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233 x111
Fax: (860) 221-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

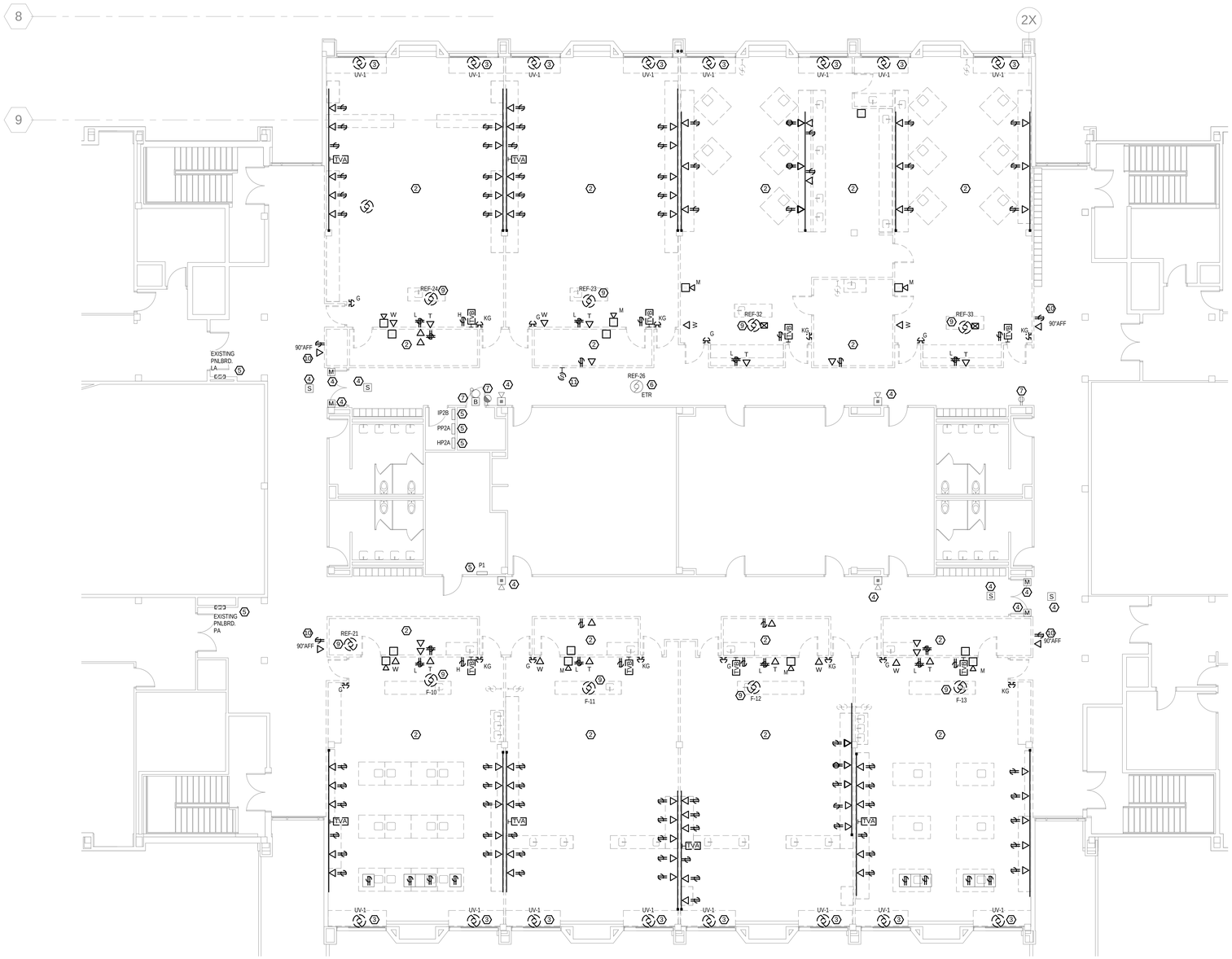
P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN R.N.
SCALE As indicated

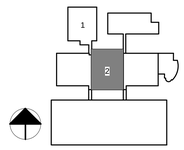
REVISIONS:
1 3-22-2018 ADDENDUM 4

SECOND FLOOR AREA 2 LIGHTING PLAN

EL-112



1 SECOND FLOOR - AREA 2 - POWER DEMOLITION PLAN
EPD-112 1/8" = 1'-0"



3/23/2018 11:06:32 AM C:\Users\BEMIS\Documents\17-220 - Hall HS Science Wing - MEP - 2016 - (dm).rvt

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS | ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 677-7070

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

P.I.C.		**L.D.**	
P.M.		**P.A.**	

ISSUE	Feb. 6, 2018
JOB	H16054.00
DRAWN	P.A.M.
SCALE	1/8" = 1'-0"

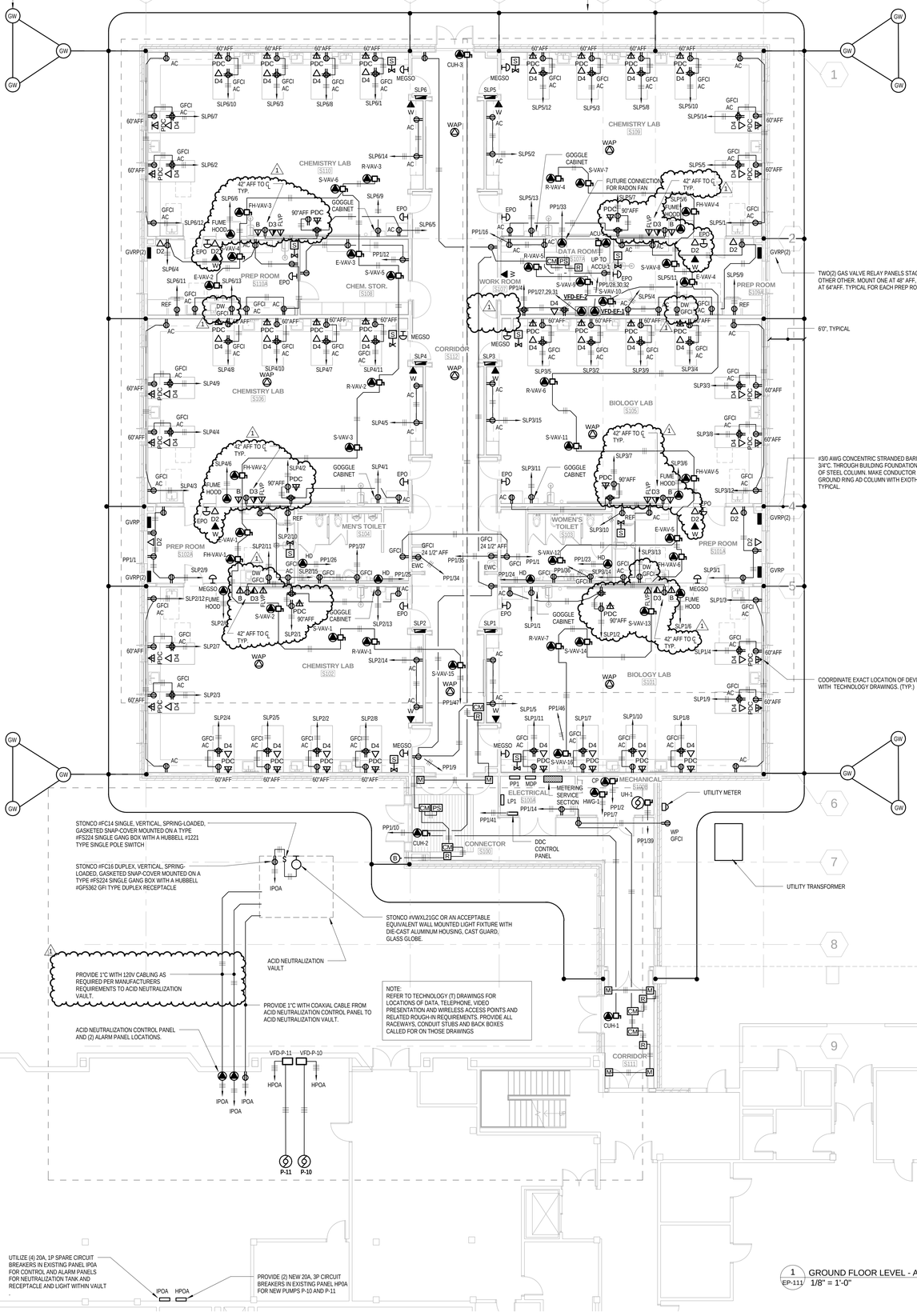
REVISIONS:

SECOND FLOOR AREA 2 POWER DEMOLITION PLAN

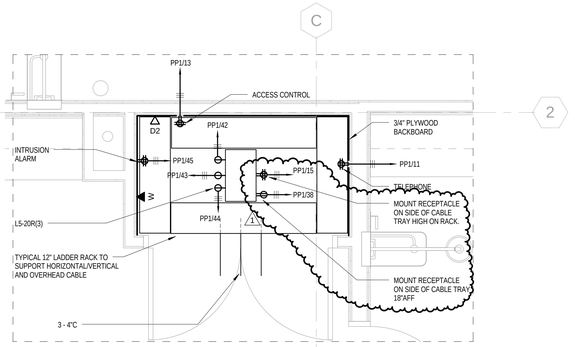
EPD-112

10' LONG X 3/4" DIA. COPPERWELD GROUND ROD INSTALLED IN A GROUNDWELL. INSTALL TOP OF GROUND ROD 6" BELOW FINISHED GRADE.MAKE CONDUCTOR CONNECTIONS WITH EXOTHERMIC WELDS. TYPICAL.

EXTERNAL BUILDING GROUND RING, #3/0 AWG CONCENTRIC STRANDED BARE COPPER CABLE RUN MINIMUM 36" BELOW FINISHED GRADE. MINIMUM CONDUCTOR BEND RADIUS SHALL BE 36", TYPICAL.



2 GROUND FLOOR LEVEL - AREA 1 ENLARGED DATA ROOM S107A PLAN
EP-111 1/2" = 1'-0"



1 GROUND FLOOR LEVEL - AREA 1 - POWER PLAN
EP-111 1/8" = 1'-0"

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233 x111
Fax: (860) 223-7656

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Maczbi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Maczbi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

P.I.C.		**L.D.**	
P.M.		**P.A.**	

ISSUE	Feb. 6, 2018
JOB	H16054.00
DRAWN	P.A.M.
SCALE	As indicated

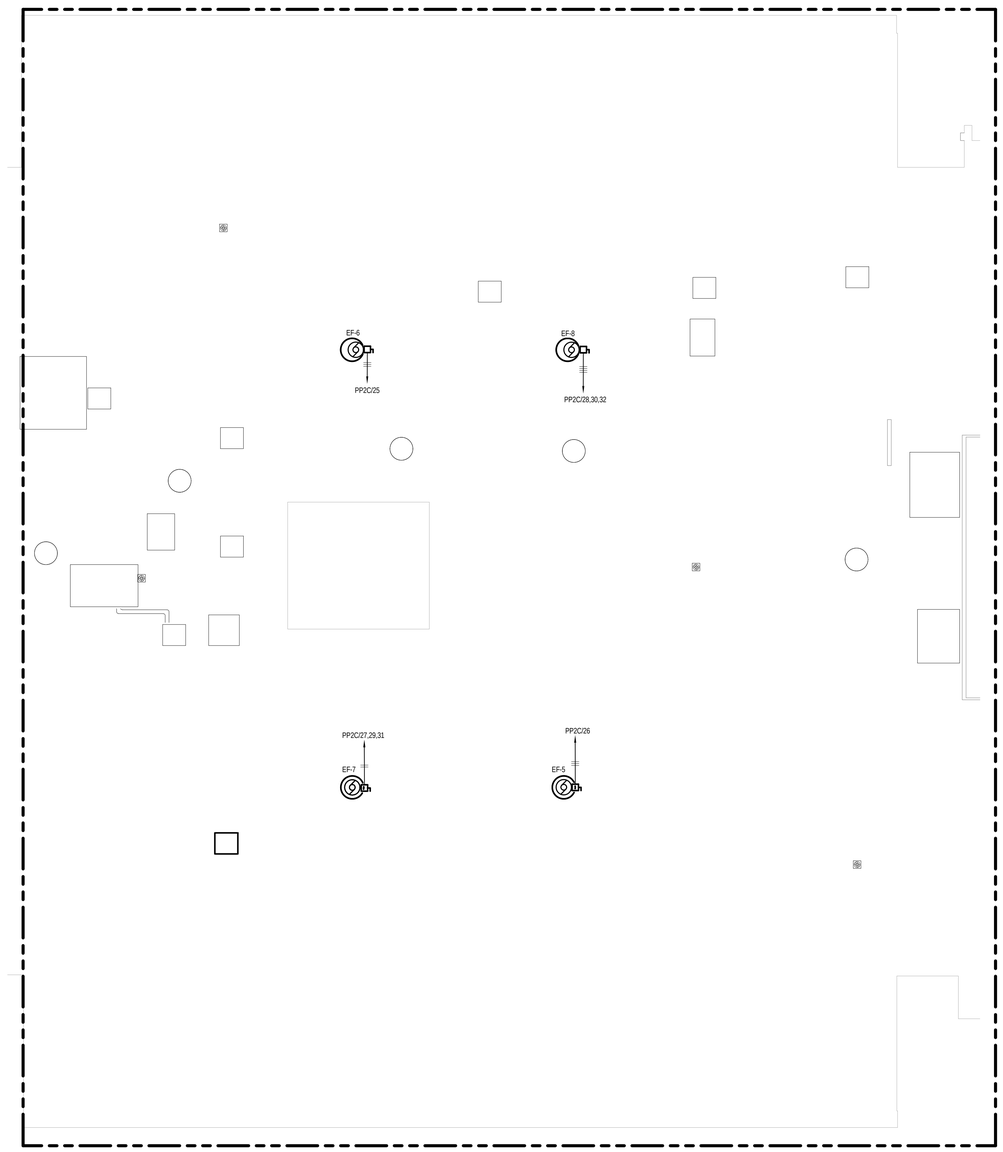
REVISIONS:

1	3-19-2018	ADDENDUM 3

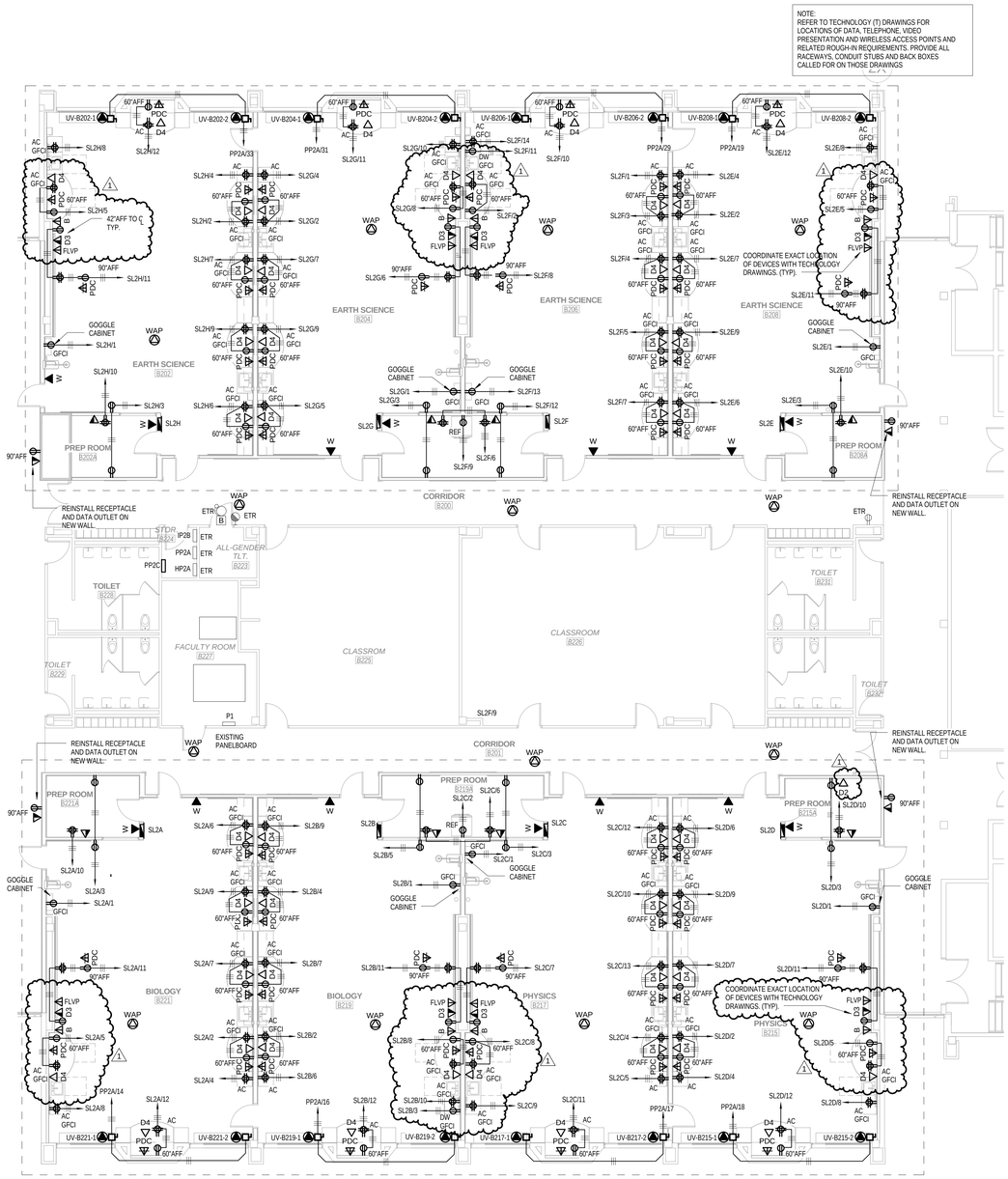
GROUND FLOOR AREA 1 POWER PLAN

EP-111

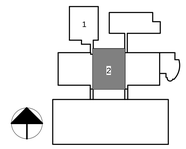
3/23/2018 11:05:17 AM C:\Users\BEMIS\Documents\17-220 - Hall HS Science Wing - MEP - 2016 - (rtm).rvt



2 PARTIAL ROOF - AREA 2 - POWER PLAN
EP-112 1/8" = 1'-0"



1 SECOND FLOOR LEVEL - AREA 2 - POWER PLAN
EP-112 1/8" = 1'-0"



HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233 x111
Fax: (860) 217-7070

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

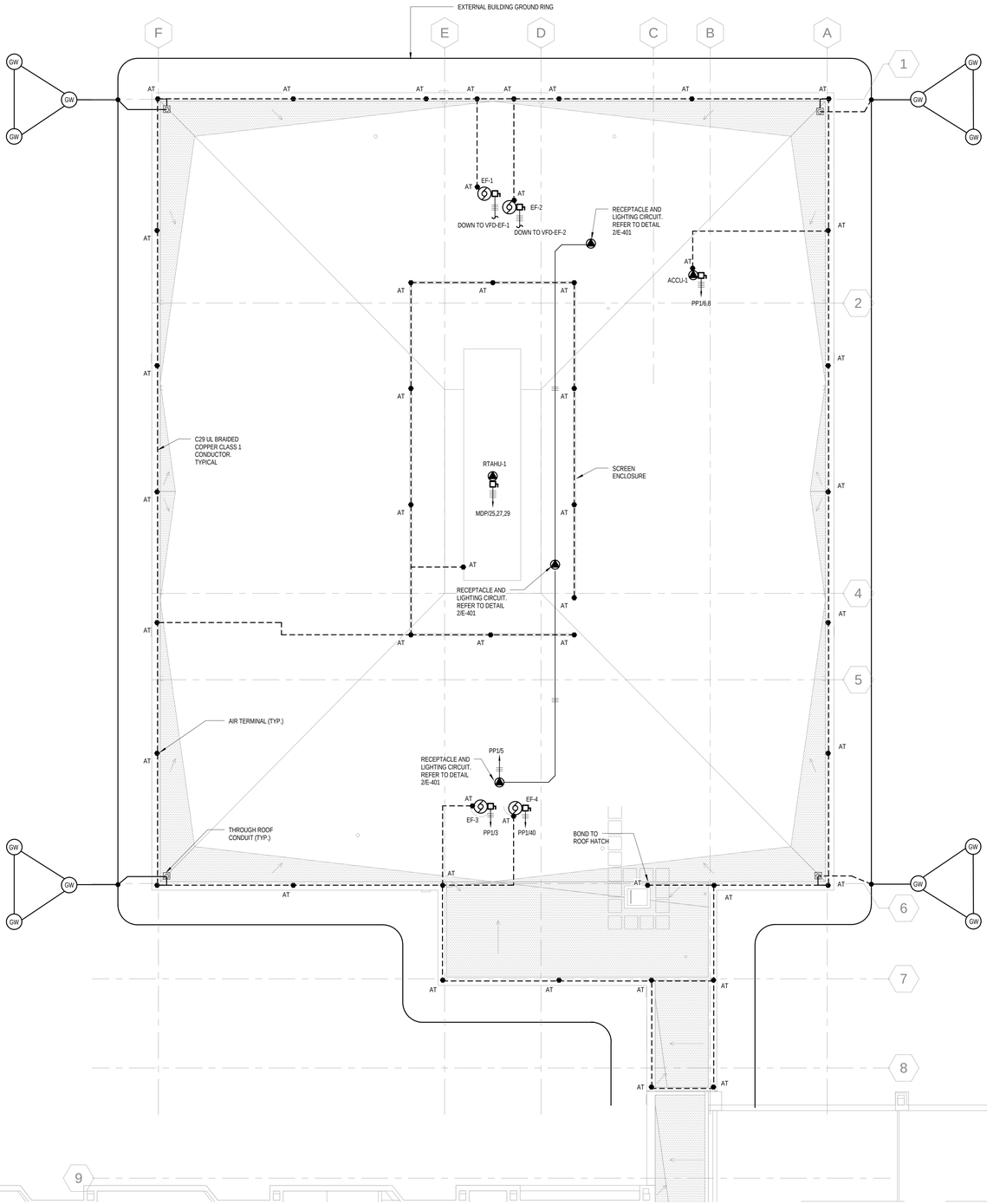
P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN P.A.M.
SCALE 1/8" = 1'-0"

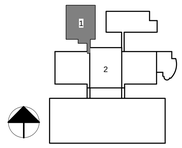
REVISIONS:
1 3-19-2018 ADDENDUM 3

SECOND FLOOR & ROOF AREA 2 POWER PLAN

EP-112



1 EP-113 ROOF - AREA 1- POWER AND LIGHTNING PROTECTION PLAN
1/8" = 1'-0"



HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 223-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Maczhi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Maczhi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

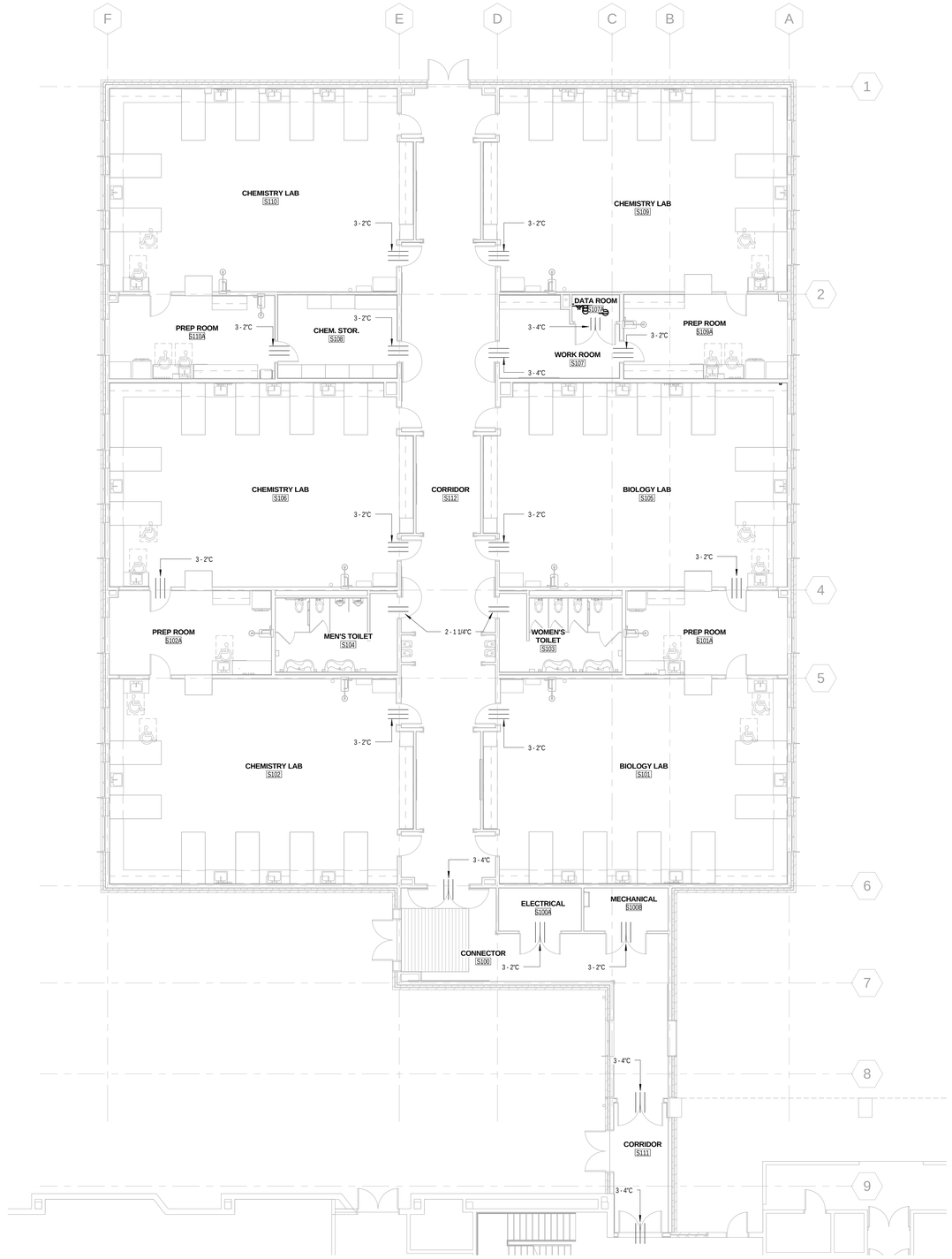
P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN P.A.M.
SCALE 1/8" = 1'-0"

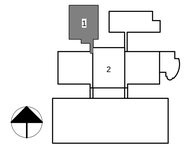
REVISIONS:

ROOF AREA 1 POWER AND LIGHTNING PROTECTION PLAN

EP-113



1 EC-111 GROUND FLOOR LEVEL - AREA 1 - DATA CONDUITS PLAN
1/8" = 1'-0"



HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS | ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 217-7070

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

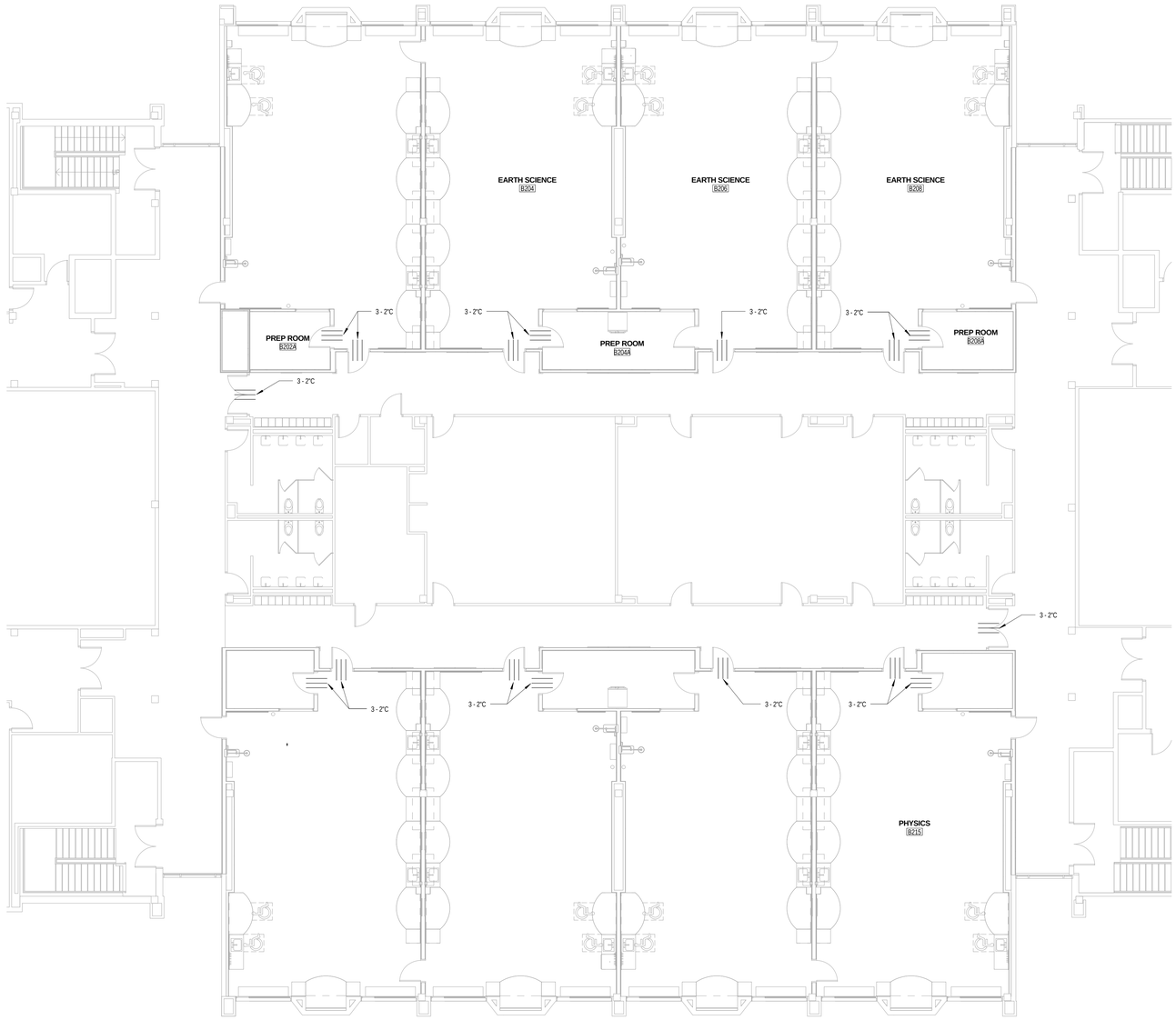
P.I.C. _____ L.D. _____
P.M. _____ P.A. _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN P.A.M.
SCALE 1/8" = 1'-0"

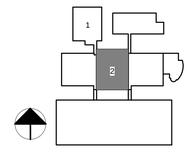
REVISIONS:

GROUND FLOOR AREA 1 DATA CONDUITS PLAN

EC-111



1 EC-112 SECOND FLOOR LEVEL - AREA 2 - DATA CONDUITS PLAN
1/8" = 1'-0"



HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS | ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 223-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

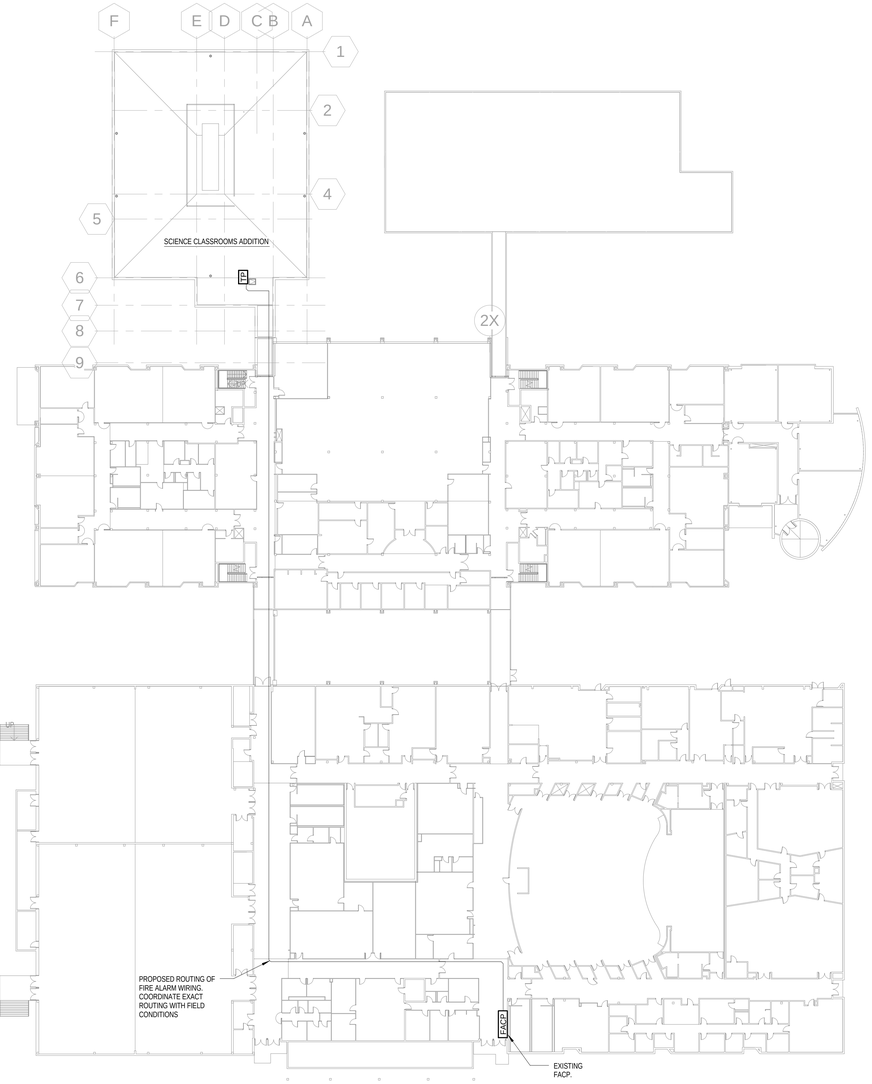
P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN P.A.M.
SCALE 1/8" = 1'-0"

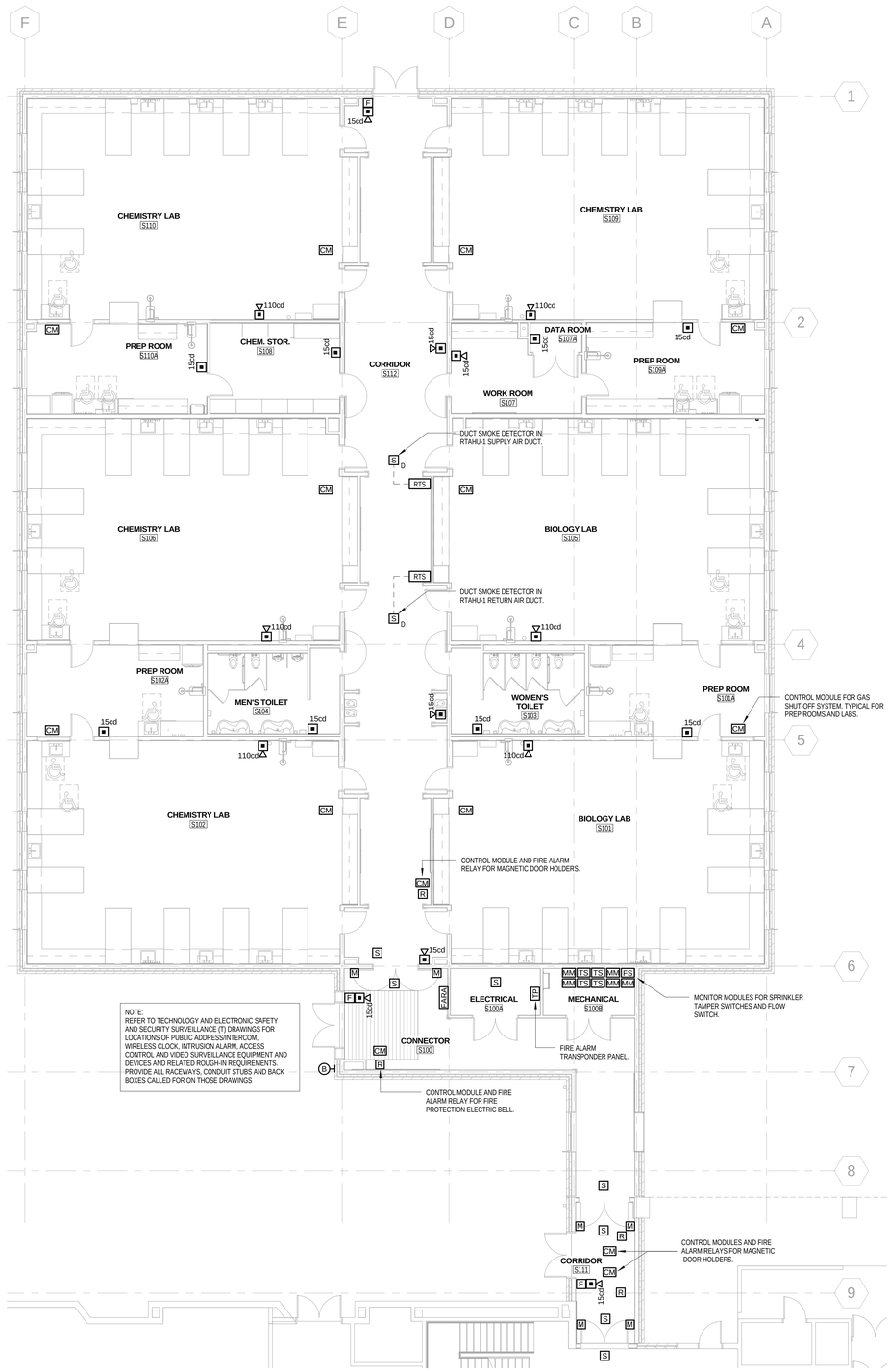
REVISIONS:

SECOND FLOOR AREA 2 DATA CONDUITS PLAN

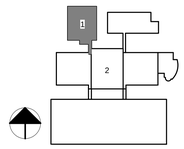
EC-112



2 ES-111 FIRST FLOOR LEVEL OVERALL PLAN - SPECIAL SYSTEMS
1/32" = 1'-0"



1 ES-111 GROUND FLOOR LEVEL - AREA 1 - SPECIAL SYSTEMS PLAN
1/8" = 1'-0"



HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 223-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Maczhi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Maczhi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

P.I.C.		L.D.	
P.M.		P.A.	

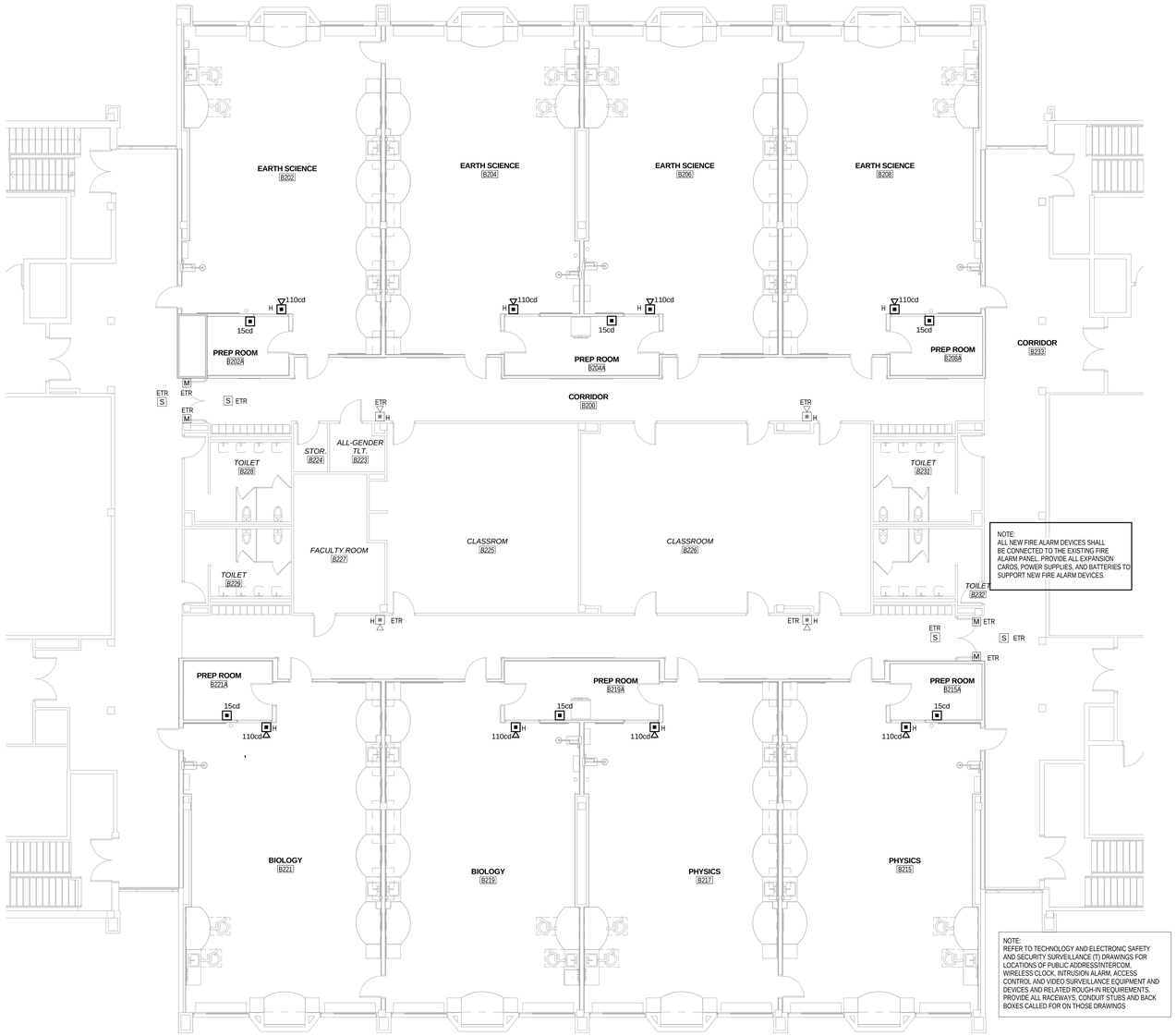
ISSUE	Feb. 6, 2018
JOB	H16054.00
DRAWN	P.A.M.
SCALE	As indicated

REVISIONS:

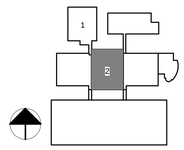
GROUND FLOOR AREA 1 SPECIAL SYSTEMS PLAN

ES-111

3/23/2018 11:08:04 AM C:\Users\BEMIS\Documents\17-220 - Hall HS Science Wing - MEP - 2016 - (rev).rvt



1 / ES-112 SECOND FLOOR LEVEL - AREA 2 - SPECIAL SYSTEMS PLAN
1/8" = 1'-0"



3/23/2018 11:08:31 AM C:\Users\BEMS\Documents\17-220 - Hall HS Science Wing - MEP - 2016 - r_dan.rvt

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS | ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233 x111
Fax: (860) 227-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN P.A.M.
SCALE 1/8" = 1'-0"

REVISIONS:

SECOND FLOOR AREA 2 SPECIAL SYSTEMS PLAN

ES-112

GENERAL NOTES - FIRE DETECTION SYSTEM

1. F.A. SIGNALLING LINE CIRCUITS (LOOPS) SHALL BE STYLE 4 (CLASS B). INITIATION CIRCUITS FROM NON-INTELLIGENT DEVICES WITH NORMALLY OPEN CONTACTS SHALL BE STYLE B (CLASS B).

2. F.A. NOTIFICATION CIRCUITS SHALL BE STYLE Y (CLASS B).

3. ALL WIRING IN NORMALLY OCCUPIED (FINISHED) AREAS OF THE BUILDING SHALL BE INSTALLED CONCEALED FROM VIEW WITHIN THE BUILDING STRUCTURE. WIRING MAY ONLY BE INSTALLED EXPOSED TO VIEW IN MECHANICAL AND ELECTRICAL ROOMS, AND ROOMS WITHOUT CEILINGS (EXPOSED TO STRUCTURE ABOVE). PROVIDE MINIMUM 3/4" EMT CONDUIT FOR WIRING RUN WITHIN WALLS, ABOVE NON-ACCESSIBLE CEILINGS, AND WHERE EXPOSED TO VIEW. PROVIDE EMT CONDUIT SLEEVES FOR ALL WIRING PENETRATIONS THROUGH WALLS, CEILINGS, AND FLOORS. PROVIDE NYLON BUSHINGS ON ALL OPEN CONDUIT ENDS TO PREVENT CHAFFING OF WIRING. ALL RACEWAYS AND CABLE SHALL BE NEATLY INSTALLED WITH RACEWAY AND CABLE RUNS INSTALLED PARALLEL TO, OR AT RIGHT ANGLES TO, THE LINES OF THE BUILDING. OPEN CABLE RUNS INSTALLED ABOVE ACCESSABLE CEILINGS SHALL BE BUNDLE TIED IN A NEAT AND ORDERLY MANNER WITH NYLON CABLE TIES. ALL WIRING SHALL BE TO TERMINALS (POINT-TO-POINT), WITHOUT SPLICES. T-TAPS OF ADDRESSABLE LOOPS SHALL BE PROHIBITED UNLESS PROVIDED WITH FAULT ISOLATOR MODULES. PROVIDE TERMINAL CABINETS AS REQUIRED FOR WIRING JUNCTIONS. TERMINAL CABINETS SHALL BE SPACE AGE ELECTRONICS TYPE TCX OR TCM AS REQUIRED FOR WIRING. TERMINAL CABINETS SHALL BE RED IN COLOR AND IDENTIFIED "FIRE ALARM TERMINAL CABINET" IN WHITE LETTERING. PAINT ALL JUNCTION BOX COVERS RED.

4 . ALL WIRING SHALL BE PLENUM RATED CABLE OF AWG SIZE RECOMMENDED BY THE FIRE ALARM SYSTEM MANUFACTURER.

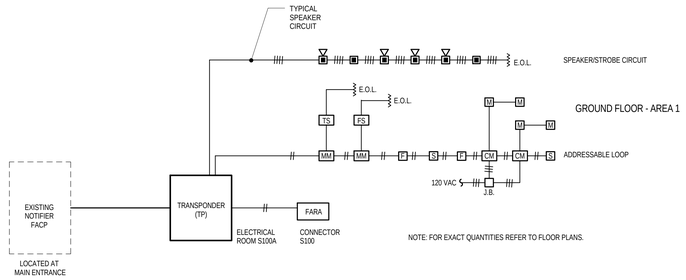
5. NOTIFICATION CIRCUITS SHALL BE LOADED TO A MAXIMUM OF 75% RATED CAPACITY. PROVIDE NAC PANELS AS REQUIRED FOR THE QUANTITY OF CIRCUITS NEEDED. LOCATE PANELS WHERE NOTED AND PROVIDE 20 AMP, 120 VAC POWER TO THE PANELS FROM SPARE 20 AMP C/B'S IN LOCAL POWER PANELS.

6. STROBES AND SPEAKER/STROBES SHALL COMPLY WITH ADA AND UL REQUIREMENTS. STROBES SHALL BE SELF-SYNCHRONIZED TO FLASH AT 1fps ACROSS THEIR FULL OPERATING VOLTAGE RANGE.

7. PROVIDE ALL 120VAC AND 24VDC POWER WIRING AND CONNECTIONS FOR A COMPLETE AND OPERABLE SYSTEM.

8. PROVIDE ALL EQUIPMENT AND LABOR AS REQUIRED TO PROVIDE FOUR (4) SYSTEM WIDE PROGRAMMING CHANGES TO MEET THE REQUIREMENTS OF THE OWNER, ENGINEER, OR LOCAL FIRE DEPARTMENT.

9. THE RISER DIAGRAM IS FOR SCHEMATIC PURPOSES ONLY AND IS INTENDED TO ESTABLISH THE SYSTEM TYPE AND WIRING REQUIREMENTS. THE CONTRACTOR SHALL FURNISH, INSTALL, AND WIRE ALL DEVICES SHOWN ON THE FLOOR PLANS.



1 ES-201 FIRE ALARM RISER DIAGRAM
N.T.S.

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS | ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233 x111
Fax: (860) 227-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN P.A.M.
SCALE 12" = 1'-0"

REVISIONS:

SPECIAL SYSTEMS DETAILS

ES-201

BRANCH PANEL: MDP

LOCATION:	ELECTRICAL S100A	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:		**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	SURFACE	**WIRES:**	4	**MAINS RATING:**	800 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	42		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	SLP1	60 A	3	2260	2260					3	60 A	SLP4	2
3	--	--	--			1980	1980			--	--	--	4
5	--	--	--					2110	2110	--	--	--	6
7	SLP3	60 A	3	3060	2800					3	60 A	SLP6	8
9	--	--	--			2270	2270			--	--	--	10
11	--	--	--					2390	2650	--	--	--	12
13	SLP2	60 A	3	3060	2980					3	60 A	SLP5	14
15	--	--	--			2450	2450			--	--	--	16
17	--	--	--					2390	2470	--	--	--	18
19	LP1	100 A	3	3014	10456					3	225 A	PP1	20
21	--	--	--			3302	8994			--	--	--	22
23	--	--	--					3197	11056	--	--	--	24
25	RTAHU-1	400 A	3	39648	0					3	20 A	SPARE	26
27	--	--	--			39648	0			--	--	--	28
29	--	--	--					39648	0	--	--	--	30
31	SPARE	100 A	3	0	0					1	20 A	SPARE	32
33	--	--	--			0	0			1	20 A	SPARE	34
35	--	--	--					0	0	1	20 A	SPARE	36
37	SPARE	20 A	1	0	0					1	20 A	SPARE	38
39	SPARE	20 A	1			0	0			1	20 A	SPARE	40
41	SPARE	20 A	1					0	0	1	20 A	SPARE	42
		TOTAL LOAD:		69538 VA		65344 VA		68021 VA					
		TOTAL AMPS:		583 A		545 A		570 A					

BRANCH PANEL: PP1

LOCATION:	ELECTRICAL S100A	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	MDP	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	SURFACE	**WIRES:**	4	**MAINS RATING:**	225 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	60		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	360	500					1	20 A	CP	2
3	EF-3	20 A	1			696	720			1	20 A	RECEPTACLES	4
5	ROOF RECEPTS/LIGHTS	20 A	1					840	1456	2	30 A	ACCU-1/ACU-1	6
7	DWH	20 A	1	500	1456					--	--	--	8
9	RECEPTACLES	20 A	1			720	250			1	20 A	CUH-1, 2 & 3	10
11	RECEPTACLES	20 A	1					360	540	1	20 A	RECEPTACLES	12
13	RECEPTACLES	20 A	1	360	540					1	20 A	RECEPTACLES	14
15	RECEPTACLES	20 A	1			360	540			1	20 A	RECEPTACLES	16
17	SPARE	20 A	3					0	0	3	20 A	SPARE	18
19	--	--	--	0	0					--	--	--	20
21	--	--	--			0	0			--	--	--	22
23	HAND DRYER	20 A	1					1600	1600	1	20 A	HAND DRYER	24
25	HAND DRYER	20 A	1	1600	1600					1	20 A	HAND DRYER	26
27	VFD-EF-2	20 A	3			1320	1320			3	20 A	VFD-EF-1	28
29	--	--	--					1320	1320	--	--	--	30
31	--	--	--	1320	1320					--	--	--	32
33	FUTURE RADON FAN	20 A	1			1000	180			1	20 A	RECEPTACLES	34
35	RECEPTACLES	20 A	1					180	360	1	20 A	RECEPTACLES	36
37	RECEPTACLES	20 A	1	360	180					1	20 A	RECEPTACLES	38
39	RECEPTACLES	20 A	1			200	528			1	20 A	EF-4	40
41	DDC PANEL	20 A	1					500	180	1	20 A	RECEPTACLES	42
43	RECEPTACLES	20 A	1	180	180					1	20 A	RECEPTACLES	44
45	RECEPTACLES	20 A	1			360	800			1	20 A	VAV BOXES	46
47	VAV BOXES	20 A	1					800	0	1	20 A	SPARE	48
49	SPARE	20 A	1	0	0					1	20 A	SPARE	50
51	SPARE	20 A	1			0	0			1	20 A	SPARE	52
53	SPARE	20 A	1					0	0	1	20 A	SPARE	54
55	SPARE	20 A	1	0	0					1	20 A	SPARE	56
57	SPARE	20 A	1			0	0			1	20 A	SPARE	58
59	SPARE	20 A	1					0	0	1	20 A	SPARE	60
		TOTAL LOAD:		10456 VA		8994 VA		11056 VA					
		TOTAL AMPS:		89 A		75 A		94 A					

BRANCH PANEL: LP1

LOCATION:	ELECTRICAL S100A	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	MDP	**PHASES:**	3	**MAINS TYPE:**	MCB
MOUNTING:	SURFACE	**WIRES:**	4	**MAINS RATING:**	225 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	30		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	EXTERIOR LIGHTING	20 A	1	90	675					1	20 A	LIGHTING	2
3	SITE LIGHTING	20 A	1			390	663			1	20 A	LIGHTING	4
5	LIGHTING	20 A	1					460	490	1	20 A	LIGHTING	6
7	LIGHTING	20 A	1	1124	1124					1	20 A	LIGHTING	8
9	LIGHTING	20 A	1			1124	1124			1	20 A	LIGHTING	10
11	LIGHTING	20 A	1					1124	1124	1	20 A	LIGHTING	12
13	SPARE	20 A	1	0	0					1	20 A	SPARE	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
25	SPARE	20 A	1	0	0					1	20 A	SPARE	26
27	SPARE	20 A	1			0	0			1	20 A	SPARE	28
29	SPARE	20 A	1					0	0	1	20 A	SPARE	30
		TOTAL LOAD:		3014 VA		3302 VA		3199 VA					
		TOTAL AMPS:		25 A		28 A		27 A					

BRANCH PANEL: SLP1

LOCATION:	CORRIDOR S112	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	MDP	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	900					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			360	540			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					360	1200	1	20 A	FUME HOOD	6
7	RECEPTACLES	20 A	1	540	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	540			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					540	10	1	20 A	SHUNT TRIP CIRCUIT	12
13	GVRP *	20 A	1	100	0					1	20 A	SPARE	14
15						0				1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		2260 VA		1980 VA		2110 VA					
		TOTAL AMPS:		19 A		17 A		18 A					

BRANCH PANEL: SLP2

LOCATION:	CORRIDOR S112	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	MDP	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	900	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			540	540			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	1200	1	20 A	FUME HOOD	6
7	RECEPTACLES	20 A	1	540	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			720	180			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					180	360	1	20 A	RECEPTACLES	12
13	RECEPTACLES	20 A	1	180	360					1	20 A	RECEPTACLES	14
15	RECEPTACLES	20 A	1			360	10			1	20 A	SHUNT TRIP CIRCUIT	16
17	GVRP *	20 A	1					100	10	1	20 A	SHUNT TRIP CIRCUIT	18
19					0					1	20 A	SPARE	20
21	GVRP *	20 A	1			100	0			1	20 A	SPARE	22
23									0	1	20 A	SPARE	24
		TOTAL LOAD:		3060 VA		2450 VA		2390 VA					
		TOTAL AMPS:		26 A		20 A		20 A					

BRANCH PANEL: SLP3

LOCATION:	CORRIDOR S112	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	MDP	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	540	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			540	540			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	1200	1	20 A	FUME HOOD	6
7	RECEPTACLES	20 A	1	900	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	180			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					180	360	1	20 A	RECEPTACLES	12
13	RECEPTACLES	20 A	1	180	360					1	20 A	RECEPTACLES	14
15	RECEPTACLES	20 A	1			360	10			1	20 A	SHUNT TRIP CIRCUIT	16
17	GVRP *	20 A	1					100	10	1	20 A	SHUNT TRIP CIRCUIT	18
19					0					1	20 A	SPARE	20
21	GVRP *	20 A	1			100	0			1	20 A	SPARE	22
23									0	1	20 A	SPARE	24
		TOTAL LOAD:		3060 VA		2270 VA		2390 VA					
		TOTAL AMPS:		26 A		19 A		20 A					

BRANCH PANEL: SLP4

LOCATION:	CORRIDOR S112	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	MDP	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	900					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			360	540			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					360	1200	1	20 A	FUME HOOD	6
7	RECEPTACLES	20 A	1	540	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	540			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					540	10	1	20 A	SHUNT TRIP CIRCUIT	12
13	GVRP *	20 A	1	100	0					1	20 A	SPARE	14
15						0				1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		2260 VA		1980 VA		2110 VA					
		TOTAL AMPS:		19 A		17 A		18 A					

BRANCH PANEL: SLP5

LOCATION:	CORRIDOR S112	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	MDP	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	360	360					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			540	1080			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	1200	1	20 A	FUME HOOD	6
7	RECEPTACLES	20 A	1	900	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			180	540			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					180	540	1	20 A	RECEPTACLES	12
13	RECEPTACLES	20 A	1	180	540					1	20 A	RECEPTACLES	14
15	GVRP *	20 A	1			100	10			1	20 A	SHUNT TRIP CIRCUIT	16
17									10	1	20 A	SHUNT TRIP CIRCUIT	18
19	GVRP *	20 A	1	100	0					1	20 A	SPARE	20
21						0				1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		2980 VA		2450 VA		2470 VA					
		TOTAL AMPS:		25 A		20 A		21 A					

BRANCH PANEL: SLP6

LOCATION:	CORRIDOR S112	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	MDP	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:

SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.

VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	540	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			540	1080			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					900	1200	1	20 A	FUME HOOD	6
7	RECEPTACLES	20 A	1	540	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			180	360			1	20 A	RECEPTACLES	10
11	REFIGERATOR	20 A	1					180	360	1	20 A	RECEPTACLES	12
13	DISWASHER	20 A	1	180	360					1	20 A	RECEPTACLES	14
15	GVRP *	20 A	1			100	10			1	20 A	SHUNT TRIP CIRCUIT	16
17									10	1	20 A	SHUNT TRIP CIRCUIT	18
19	GVRP *	20 A	1	100	0					1	20 A	SPARE	20
21						0				1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		2800 VA		2270 VA		2650 VA					
		TOTAL AMPS:		24 A		19 A		23 A					

SCHEDULE OF BRANCH CIRCUIT CONDUCTOR SIZES

C/B SIZE	* CIRCUIT SIZE
20A-1P	2 X #12 AWG AND 1 X #12 AWG GND. IN 3/4" C.
20A-2P	2 X #12 AWG AND 1 X #12 AWG GND. IN 3/4" C.
20A-3P	3 X #12 AWG AND 1 X #12 AWG GND. IN 3/4" C.
25A-1P	2 X #10 AWG AND 1 X #10 AWG GND. IN 3/4" C.
25A-2P	2 X #10 AWG AND 1 X #10 AWG GND. IN 3/4" C.
25A-3P	3 X #10 AWG AND 1 X #10 AWG GND. IN 3/4" C.
30A-1P	2 X #10 AWG AND 1 X #10 AWG GND. IN 3/4" C.
30A-2P	2 X #10 AWG AND 1 X #10 AWG GND. IN 3/4" C.
30A-3P	3 X #10 AWG AND 1 X #10 AWG GND. IN 3/4" C.
35A-1P	2 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
35A-2P	2 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
35A-3P	3 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
40A-1P	2 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
40A-2P	2 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
40A-3P	3 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
45A-1P	2 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
45A-2P	2 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
45A-3P	3 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
50A-1P	2 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
50A-2P	2 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
50A-3P	3 X #8 AWG AND 1 X #10 AWG GND. IN 3/4" C.
60A-1P	2 X #6 AWG AND 1 X #10 AWG GND. IN 1" C.
60A-2P	2 X #6 AWG AND 1 X #10 AWG GND. IN 1" C.
60A-3P	3 X #6 AWG AND 1 X #10 AWG GND. IN 1" C.
70A-1P	2 X #4 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
70A-2P	2 X #4 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
70A-3P	3 X #4 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
80A-1P	2 X #4 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
80A-2P	2 X #4 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
80A-3P	3 X #4 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
90A-1P	2 X #3 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
90A-2P	2 X #3 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
90A-3P	3 X #3 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
100A-1P	2 X #3 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
100A-2P	2 X #3 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
100A-3P	3 X #3 AWG AND 1 X #8 AWG GND. IN 1 1/4" C.
110A-3P	3 X #2 AWG AND 1 X #6 AWG GND. IN 1 1/4" C.
125A-3P	3 X #1 AWG AND 1 X #6 AWG GND. IN 1 1/4" C.
150A-3P	3 X #1/0 AWG AND 1 X #6 AWG GND. IN 1 1/2" C.
175A-3P	3 X #2/0 AWG AND 1 X #6 AWG GND. IN 2" C.
200A-3P	3 X #3/0 AWG AND 1 X #6 AWG GND. IN 2" C.

* PROVIDE CIRCUIT SIZE AND NUMBER OF CONDUCTORS SCHEDULED UNLESS NOTED OR SHOWN DIFFERENTLY ON THE DRAWINGS. CROSS REFERENCE CIRCUIT DESIGNATIONS SHOWN ON DRAWINGS WITH RESPECTIVE PANEL SCHEDULES TO OBTAIN C/B SIZE.

** PROVIDE #10 AWG SIZE CONDUCTORS FOR BRANCH CIRCUIT RUNS EXCEEDING 75' IN CONDUCTOR LENGTH AND #8 AWG SIZE CONDUCTORS FOR BRANCH CIRCUIT RUNS EXCEEDING 150' IN CONDUCTOR LENGTH.

GENERAL NOTES FOR PANELBOARDS

1. PROVIDE WITH SILVER PLATED COPPER BUS BARS AND COPPER GRAOUND BAR.
2. PROVIDE WITH DOOR-IN-DOOR TRIM.
3. PROVIDE WITH BLACK FACE/WHITE CORE ENGRAVED NAMEPLATE FIXED TO PANEL WITH TWO SCREWS OR RIVETS.
4. PROVIDE WITH METAL FRAME, PLASTIC COVER CIRCUIT DIRECTORY FRAME.
5. PROVIDE WITH TYPE WRITTEN CIRCUIT DIRECTORY REPRESENTING CIRCUITS AS ACTUALLY CONNECTED TO PANEL.
6. CIRCUIT BREAKERS SHALL BE BOLT-ON TYPE.
7. * = CIRCUIT BREAKER WITH 120V SHUNT TRIP COIL.

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 647-1222 x111
Fax: (860) 221-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Maczhi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Maczhi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

P.I.C. _____ L.D. _____
P.M. _____ P.A. _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN R.N.
SCALE N.T.S.

REVISIONS:

1. 3-22-2018 ADDENDUM 4

ELECTRICAL PANELBOARD SCHEDULES

E-201

BRANCH PANEL: PP2C

LOCATION:	STOR. B224	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:		**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	SURFACE	**WIRES:**	4	**MAINS RATING:**	400 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	42		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	SL2A	60 A	3	1620	1800					3	60 A	SL2B	2
3	--	--	--			1620	1620			--	--	--	4
5	--	--	--					2340	1980	--	--	--	6
7	SL2C	60 A	3	2160	1620					3	60 A	SL2D	8
9	--	--	--			1800	1620			--	--	--	10
11	--	--	--					2160	2340	--	--	--	12
13	SL2E	60 A	3	1620	2700					3	60 A	SL2F	14
15	--	--	--			1620	1800			--	--	--	16
17	--	--	--					2340	1800	--	--	--	18
19	SL2G	60 A	3	1800	1620					3	60 A	SL2H	20
21	--	--	--			1620	1620			--	--	--	22
23	--	--	--					1800	2340	--	--	--	24
25	EF-6	20 A	1	864	864					1	20 A	EF-5	26
27	EF-7	20 A	3			444	444			3	20 A	EF-8	28
29	--	--	--					444	444	--	--	--	30
31	--	--	--	444	444					--	--	--	32
33	SPARE	20 A	3			0	0			3	20 A	SPARE	34
35	--	--	--					0	0	--	--	--	36
37	--	--	--	0	0					--	--	--	38
39	SPARE	20 A	1			0	0			1	20 A	SPARE	40
41	SPARE	20 A	1					0	0	1	20 A	SPARE	42
		TOTAL LOAD:		17556 VA		14208 VA		17988 VA					
		TOTAL AMPS:		151 A		118 A		154 A					

BRANCH PANEL: SL2A

LOCATION:	AUDIO VISUAL B132	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	PP2C	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			360	360			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	540	1	20 A	RECEPTACLES	6
7	RECEPTACLES	20 A	1	540	360					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	360			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					720	540	1	20 A	RECEPTACLES	12
13	SPARE	20 A	1	0	0					1	20 A	SPARE	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		1620 VA		1620 VA		2340 VA					
		TOTAL AMPS:		14 A		14 A		20 A					

BRANCH PANEL: SL2B

LOCATION:	WORK ROOM B140	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	PP2C	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			180	540			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					360	360	1	20 A	RECEPTACLES	6
7	RECEPTACLES	20 A	1	540	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	360			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					720	540	1	20 A	RECEPTACLES	12
13	SPARE	20 A	1	0	0					1	20 A	SPARE	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		1800 VA		1620 VA		1980 VA					
		TOTAL AMPS:		15 A		14 A		17 A					

BRANCH PANEL: SL2C

LOCATION:	PHYSICS B217	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	PP2C	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	180					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			360	540			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					360	720	1	20 A	RECEPTACLES	6
7	RECEPTACLES	20 A	1	720	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			360	540			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					540	540	1	20 A	RECEPTACLES	12
13	RECEPTACLES	20 A	1	540	0					1	20 A	SPARE	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		2160 VA		1800 VA		2160 VA					
		TOTAL AMPS:		18 A		15 A		18 A					

BRANCH PANEL: SL2D

LOCATION:	LIBRARY CLASSROOM...	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	PP2C	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			360	360			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	540	1	20 A	RECEPTACLES	6
7	RECEPTACLES	20 A	1	540	360					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	360			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					720	540	1	20 A	RECEPTACLES	12
13	SPARE	20 A	1	0	0					1	20 A	SPARE	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		1620 VA		1620 VA		2340 VA					
		TOTAL AMPS:		14 A		14 A		20 A					

BRANCH PANEL: SL2E

LOCATION:	EARTH SCIENCE B208	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	PP2C	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			360	360			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	540	1	20 A	RECEPTACLES	6
7	RECEPTACLES	20 A	1	540	360					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	360			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					720	540	1	20 A	RECEPTACLES	12
13	SPARE	20 A	1	0	0					1	20 A	SPARE	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		1620 VA		1620 VA		2340 VA					
		TOTAL AMPS:		14 A		14 A		20 A					

BRANCH PANEL: SL2F

LOCATION:	EARTH SCIENCE B206	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	PP2C	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	360	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			540	540			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	720	1	20 A	RECEPTACLES	6
7	RECEPTACLES	20 A	1	540	720					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			180	540			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					180	360	1	20 A	RECEPTACLES	12
13	RECEPTACLES	20 A	1	180	360					1	20 A	RECEPTACLES	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		2700 VA		1800 VA		1800 VA					
		TOTAL AMPS:		23 A		15 A		15 A					

BRANCH PANEL: SL2G

LOCATION:	EARTH SCIENCE B204	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	PP2C	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			360	360			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	720	1	20 A	RECEPTACLES	6
7	RECEPTACLES	20 A	1	540	540					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	360			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					540	0	1	20 A	SPARE	12
13	SPARE	20 A	1	0	0					1	20 A	SPARE	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		1800 VA		1620 VA		1800 VA					
		TOTAL AMPS:		15 A		14 A		15 A					

BRANCH PANEL: SL2H

LOCATION:	EARTH SCIENCE B202	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	65K
SUPPLY FROM:	PP2C	**PHASES:**	3	**MAINS TYPE:**	MLO
MOUNTING:	RECESSED	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	24		

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	RECEPTACLES	20 A	1	180	540					1	20 A	RECEPTACLES	2
3	RECEPTACLES	20 A	1			360	360			1	20 A	RECEPTACLES	4
5	RECEPTACLES	20 A	1					540	540	1	20 A	RECEPTACLES	6
7	RECEPTACLES	20 A	1	540	360					1	20 A	RECEPTACLES	8
9	RECEPTACLES	20 A	1			540	360			1	20 A	RECEPTACLES	10
11	RECEPTACLES	20 A	1					720	540	1	20 A	RECEPTACLES	12
13	SPARE	20 A	1	0	0					1	20 A	SPARE	14
15	SPARE	20 A	1			0	0			1	20 A	SPARE	16
17	SPARE	20 A	1					0	0	1	20 A	SPARE	18
19	SPARE	20 A	1	0	0					1	20 A	SPARE	20
21	SPARE	20 A	1			0	0			1	20 A	SPARE	22
23	SPARE	20 A	1					0	0	1	20 A	SPARE	24
		TOTAL LOAD:		1620 VA		1620 VA		2340 VA					
		TOTAL AMPS:		14 A		14 A		20 A					

EXISTING BRANCH PANEL: PP2A

LOCATION:	STOR. B224	**VOLTAGE:**	120/208 Wye	**AISC RATING:**	22K
SUPPLY FROM:		**PHASES:**	3	**MAINS TYPE:**	MCB
MOUNTING:	SURFACE	**WIRES:**	4	**MAINS RATING:**	100 A
ENCLOSURE:	TYPE 1	**MAX # OF POLES:**	42	**MCB RATING:**	100 A

NOTES:
SEE SPECIFICATION SECTION 'PANELBOARDS' FOR FEATURES OF PANELBOARDS.
VERIFY SIZE, QUANTITY AND TYPES OF CIRCUIT BREAKERS IN PANELBOARDS WITH PLANS, RISERS, SCHEDULES, AND SPECIFICATIONS.

CKT	CIRCUIT DESCRIPTION	TRIP	POLES	A		B		C		POLES	TRIP	CIRCUIT DESCRIPTION	CKT
1	EXISTING CIRCUIT	20 A	1	0	0					1	20 A	EXISTING CIRCUIT	2
3	EXISTING CIRCUIT	20 A	1			0	0			1	20 A	EXISTING CIRCUIT	4
5	EXISTING CIRCUIT	20 A	1					0	0	1	20 A	EXISTING CIRCUIT	6
7	EXISTING CIRCUIT	20 A	1	0	0					1	20 A	EXISTING CIRCUIT	8
9	EXISTING CIRCUIT	20 A	1			0	0			1	20 A	EXISTING CIRCUIT	10
11	EXISTING CIRCUIT	20 A	1					0	0	1	20 A	EXISTING CIRCUIT	12
13	EXISTING CIRCUIT	20 A	1	0	1104					1	20 A	UV-B221-1 & 2	14
15	EXISTING CIRCUIT	20 A	1			0	1104			1	20 A	UV-B219-1 & 2	16
17	UV-B217-1 & 2	20 A	1					1104	1104	1	20 A	UV-B215-1 & 2	18
19	UV-B208-1 & 2	20 A	1	1104	0					1	20 A	EXISITNG CIRCUIT	20
21	EXISTING CIRCUIT	20 A	1			0	0			1	20 A	EXISTING CIRCUIT	22
23	EXISTING CIRCUIT	20 A	1					0	0	1	20 A	EXISTING CIRCUIT	24
25	EXISTING CIRCUIT	20 A	1	0	0					1	20 A	EXISTING CIRCUIT	26
27	EXISTING CIRCUIT	20 A	1			0	0			1	20 A	EXISTING CIRCUIT	28
29	UV-B206-1 & 2	20 A	1					1104	0	1	20 A	EXISTING CIRCUIT	30
31	UV-B204-1 & 2	20 A	1	1104	0					3	100 A	MAIN CIRCUIT BREAKER	32
33	UV-B202-1 & 2	20 A	1			1104	0			--	--	--	34
35	Spare	20 A	1					0	0	--	--	--	36
37	Space	--	--	0	0					--	--	Space	38
39	Space	--	--			0	0			--	--	Space	40
41	Space	--	--					0	0	--	--	Space	42
		TOTAL LOAD:		3312 VA		2208 VA		3312 VA					
		TOTAL AMPS:		29 A		18 A		29 A					

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233 x111
Fax: (860) 223-7656

JCJ ARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Maczbi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Maczbi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

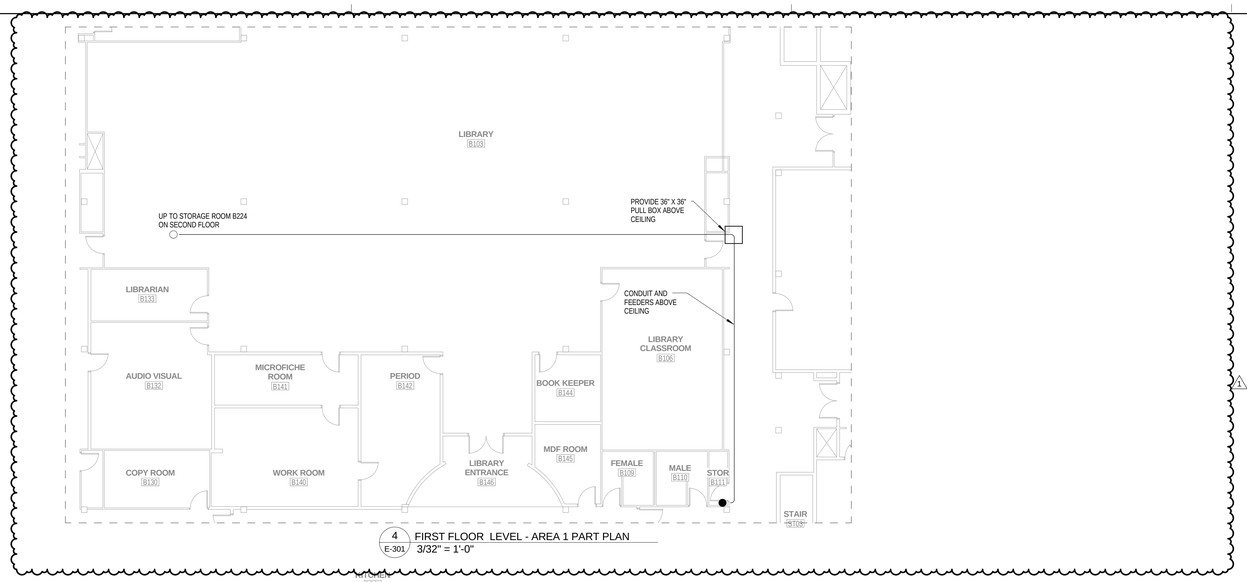
P.I.C. _____ L.D. _____
P.M. _____ P.A. _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN R.N.
SCALE _____

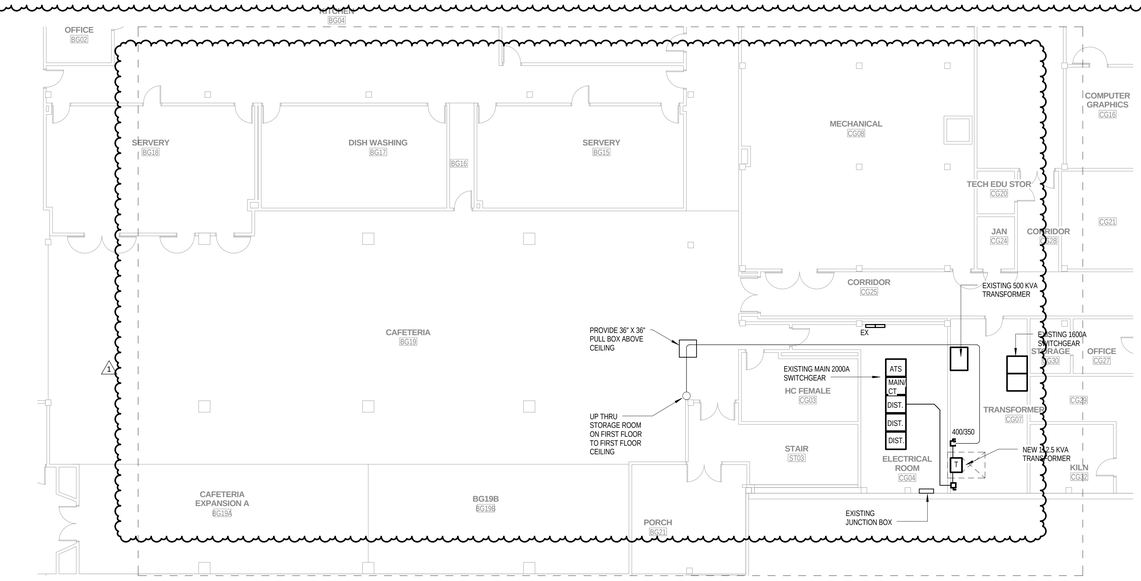
REVISIONS:
1 3-22-2018 ADDENDUM 4

ELECTRICAL PANELBOARD SCHEDULES

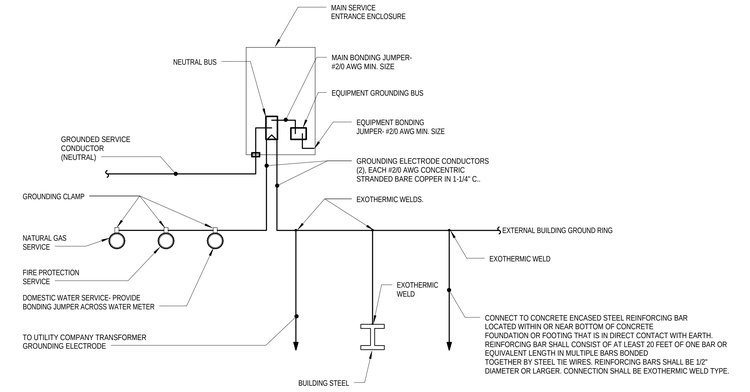
E-202



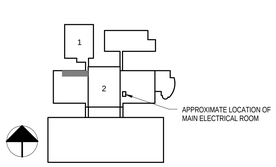
4 E-301 FIRST FLOOR LEVEL - AREA 1 PART PLAN
3/32" = 1'-0"



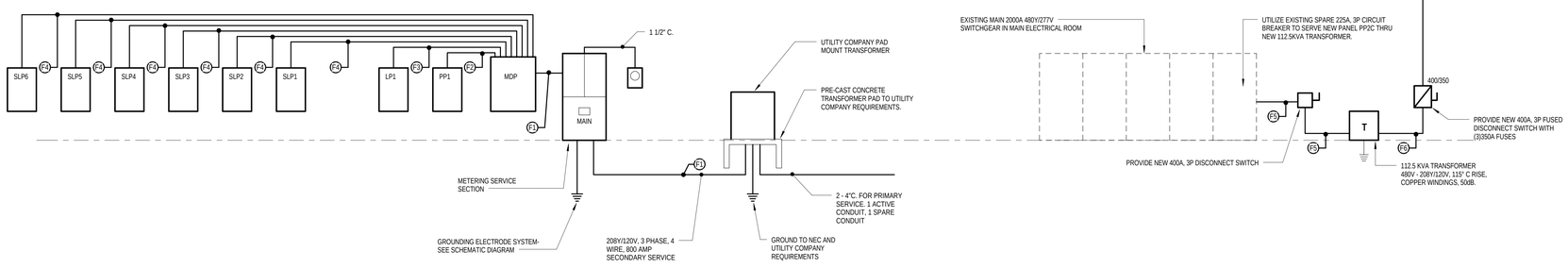
3 E-301 GROUND FLOOR LEVEL - AREA 1 - EXISTING MAIN ELECTRICAL ROOM
3/32" = 1'-0"



2 E-301 GROUNDING ELECTRODE SYSTEMS SCHEMATIC
N.T.S.



FEEDER SCHEDULE - COPPER CONDUCTORS				
SYMBOL	FEEDER OCP	FEEDER AMPACITY	FEEDER SIZE	REMARKS
F1	800A	840A	3 - 4" C. WITH 4 X #350 kcmil XHHW-2 IN EACH.	-
F2	225A	232A	4 X #250 kcmil XHHW-2 AND 1 X#4 XHHW-2 GND. IN 2-1/2" C.	-
F3	100A	104A	4 X #2 XHHW-2 AND AND 1 X #8 XHHW-2 GND. IN 1-1/4" C.	-
F4	60A	60A	4 X #6 XHHW-2 AND 1 X #8 XHHW-2 GND. IN 1" C.	-
F5	225A	230A	3 X #4/0 XHHW-2 AND AND 1 X #4 XHHW-2 GND. IN 2" C.	-
F6	350A	360A	2 - 2 1/2" C WITH 4 X #3/0 XHHW-2 AND 1 X #3 XHHW-2 GND IN EACH	-



1 E-301 POWER RISER DIAGRAM
N.T.S.

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
185 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 227-7870

JCJARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

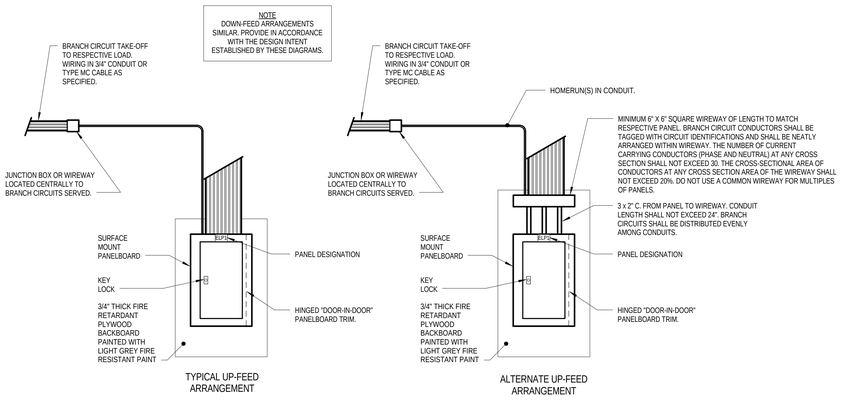
P.I.C. _____ **L.D.** _____
P.M. _____ **P.A.** _____

ISSUE Feb. 6, 2018
JOB H16054.00
DRAWN R.N.
SCALE As indicated

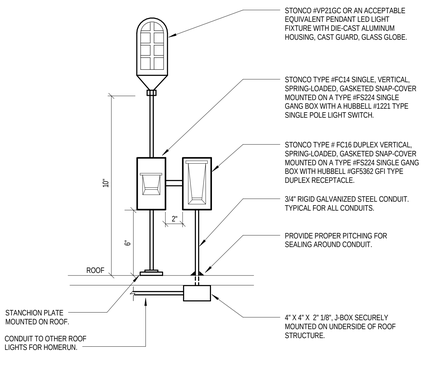
REVISIONS:
1 3-19-2018 ADDENDUM 3

POWER RISER DIAGRAM AND DETAILS

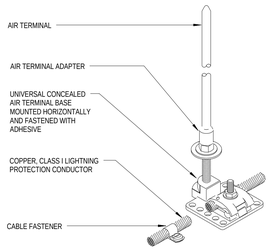
E-301



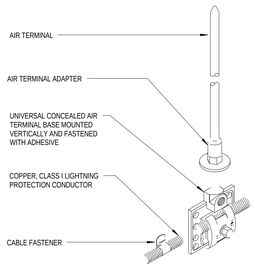
1 E-401 TYPICAL BRANCH CIRCUIT HOMERUN ARRANGEMENTS N.T.S.



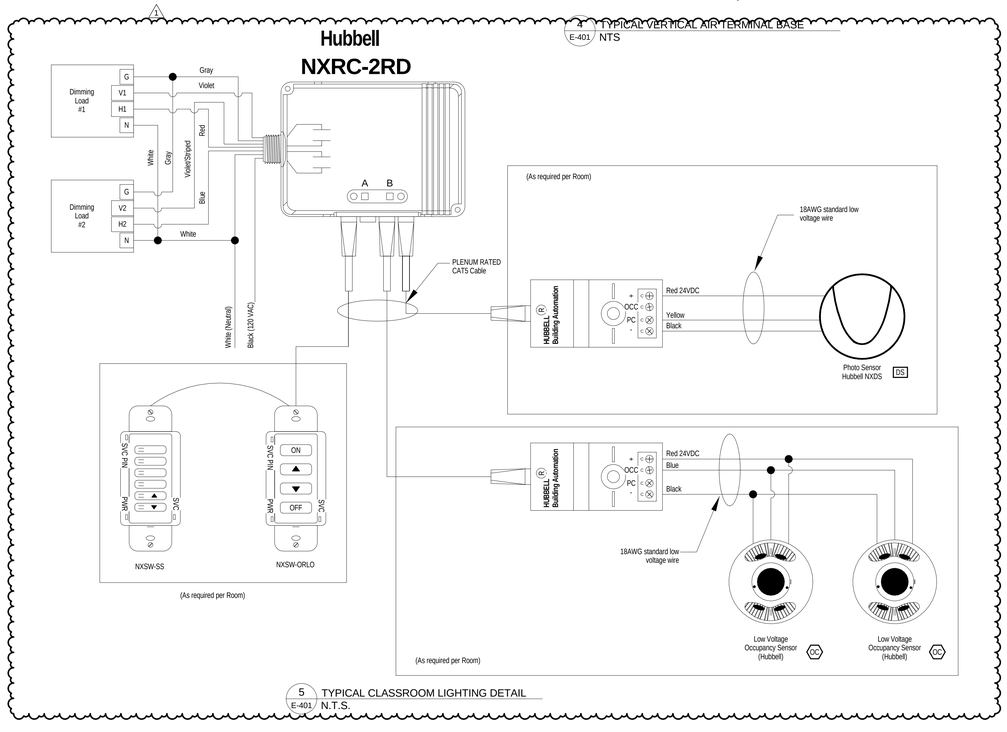
2 E-401 ROOF MOUNTED LIGHT/RECEPTACLE DETAIL N.T.S.



3 E-401 TYPICAL HORIZONTIAL AIR TERMINAL BASE NTS



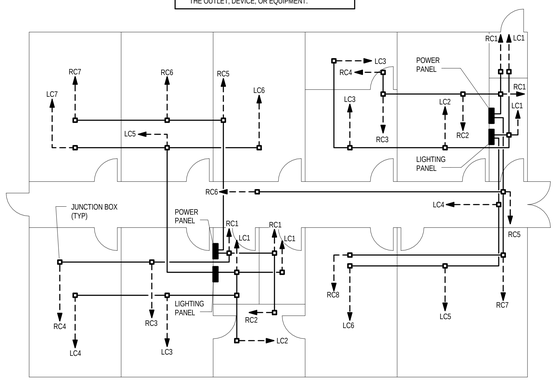
4 E-401 TYPICAL VERTICAL AIR TERMINAL BASE NTS



5 E-401 TYPICAL CLASSROOM LIGHTING DETAIL N.T.S.

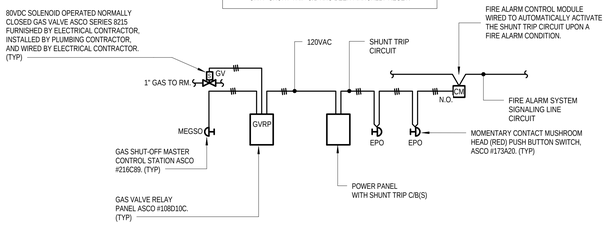
LEGEND	
▬	PANELBOARD
▫	JUNCTION BOX
———	BRANCH CIRCUIT WIRING IN CONDUIT
- - -	BRANCH CIRCUIT WIRING IN CONDUIT OR MC CABLE AS SPECIFIED
LC#	LIGHTING CIRCUIT
RC#	RECEPTACLE CIRCUIT

NOTE
BRANCH CIRCUIT CONDUITS SHALL NOT BE RUN BELOW CONCRETE SLABS OR IN CONCRETE SLABS UNLESS SPECIFICALLY INDICATED SO ON THE DRAWINGS, OR UNLESS THERE IS NO OTHER WAY TO FEED THE OUTLET, DEVICE, OR EQUIPMENT.

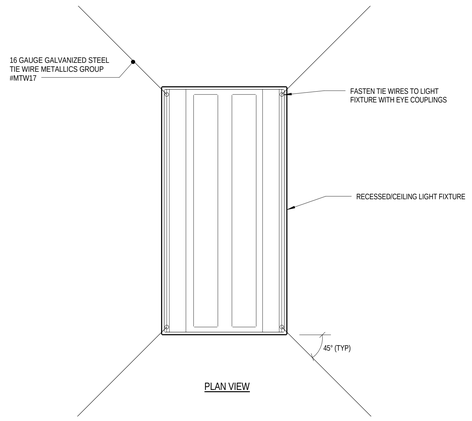


6 E-401 SCHEMATIC PLAN VIEW DIAGRAM OF TYPICAL BRANCH CIRCUIT ARRANGEMENTS N.T.S.

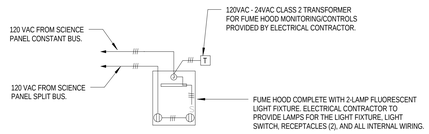
NOTE
ACTIVATION OF EPO'S OR THE FIRE ALARM SYSTEM WILL TRIP THE GVRP SHUNT TRIP C/B IN THE POWER PANEL SHUTTING OFF POWER TO THE GVRP AND CLOSING THE GAS VALVE. THE GAS VALVE CAN BE RESET AT THE MEGSO ONLY AFTER THE FIRE ALARM CONDITION HAS BEEN CLEARED AND THE POWER PANEL GRVP SHUNT TRIP C/B HAS BEEN MANUALLY RESET.



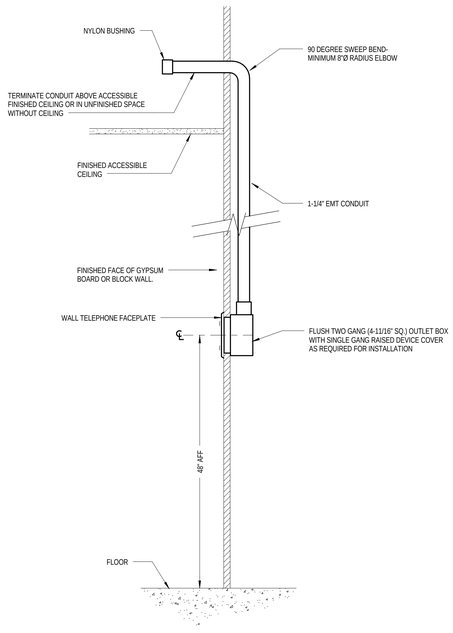
7 E-401 TYPICAL GAS SHUT-OFF RISER DIAGRAM N.T.S.



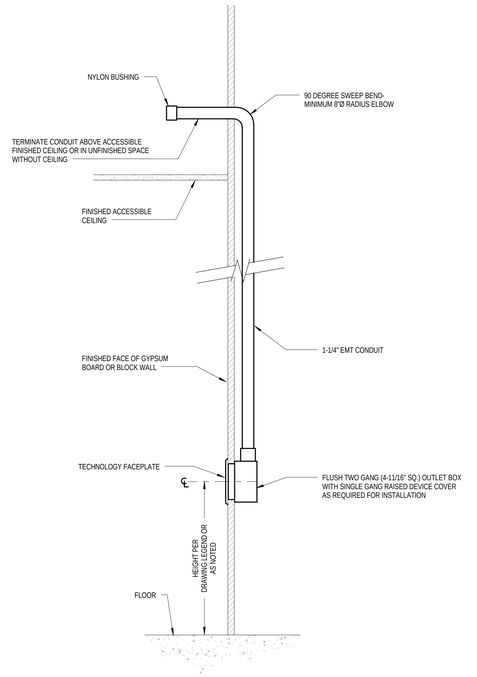
8 E-401 TYPICAL RECESSED LIGHT FIXTURE SUPPORT DETAIL N.T.S.



9 E-401 TYPICAL FUME HOOD SCHEMTIC WIRING DIAGRAM N.T.S.



10 E-401 TYPICAL WALL TELEPHONE OUTLET ROUGHING DETAIL N.T.S.



11 E-401 TYPICAL TECHNOLOGY OUTLET REOUGHING DETAIL - VOICE/DATA N.T.S.

HALL HIGH SCHOOL SCIENCE CLASSROOMS

975 NORTH MAIN STREET
WEST HARTFORD, CT 06107

STATE No. 155-0240 EA

BEMIS ASSOCIATES, LLC
Consulting Engineers
145 Main Street
Farmington, CT 06032
(860) 667-3233
Fax: (860) 677-7870

JCJ ARCHITECTURE
120 HUYSHOPE AVENUE
SUITE 400
HARTFORD, CT 06106
860.247.9226

CONSULTANTS:

Landscape Architect
Richter & Cegan, Inc.
P.O. Box 567
Avon, CT 06001
(860) 678-0669

Site / Civil Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

Structural Engineer
Macchi Engineers, LLC
44 Gillett Street
Hartford, CT 06105
(860) 549-6190

MEP Engineer
Bemis Associates, LLC
185 Main Street
Farmington, CT 06032
(860) 667-3233

Acoustic Consultant
Acentech Incorporated
33 Moulton Street
Cambridge, MA 02138
(617) 499-8080

Tele, Data and Security Consultant
Guillen Technology Consultants, LLC
9 Moody Road
Enfield, CT 06082
(860) 341-1206

Owner's Representative
Construction Solutions Group
P.O. Box 271860
West Hartford, CT 06127
(860) 306-7134

Construction Manager
Fusco Corporation
555 Long Wharf Drive, Suite 14
New Haven, CT 06511
(203) 777-7451

100% CONSTRUCTION DOCUMENTS

P.I.C.		**L.D.**	
P.M.		**P.A.**	

ISSUE	Feb. 6, 2018
JOB	H16054.00
DRAWN	R.N.
SCALE	N.T.S.

REVISIONS:
1 3-22-2018 ADDENDUM 4

ELECTRICAL DETAILS

E-401

3/23/2018 10:59:04 AM C:\Users\BEMIS\Documents\17-220 - Hall HS Science Wing - MEP - 2016 - (rvtn).rvt