MAY 27, 2022
EAST HARTFORD MAINTENANCE FACILITY AND
SIGNS & MARKINGS FACILITY
FEDERAL AID PROJECT NO.: N/A
STATE PROJECT NO. 42-324
TOWN OF EAST HARTFORD

ADDENDUM NO. 1

SPECIAL PROVISIONS

NEW SPECIAL PROVISION

The following Special Provision is hereby added to the Contract:

- CSI SECTION 262413 - SWITCHBOARDS

REVISED SPECIAL PROVISIONS

The following Special Provisions are hereby deleted in their entirety and replaced with the attached like-named Special Provisions:

- NOTICE TO CONTRACTOR – SUBMITTALS
- CSI SECTION 105700 - BAY FURNISHINGS
- CSI SECTION 113100 – APPLIANCES
- CSI SECTION 262713 - ELECTRICITY METERING
- CSI SECTION 262729 - ELECTRIC VEHICLE CHARGING STATION
- CSI SECTION 265619 – LED EXTERIOR LIGHTING

PLANS

NEW PLAN

The following Plan Sheet is hereby added to the Contract:

05.11-1.A1

REVISED PLANS

The following Plan Sheets are hereby deleted and replaced with the like-numbered Plan Sheets:

02.01.A1	04.04.A1	05.01.A1	06F.20.A1
	04.07.A1	05.03.A1	06F.24.A1
	04.08.A1	05.05.A1	
		05.11.A1	

DELETED SUBSETS

The following subsets contain duplicate information and are hereby deleted in their entirety:

01_Title Sheet.pdf

05_ELECTRICAL (SITE).pdf

06F_ELECTRICAL (MAINTENANCE).pdf

07C_FIRE PROTECTION.pdf

07F_ELECTRICAL (SIGNS & MARKING).pdf

Subset 01_TITLE SHEET with upper case letters is the correct version.
Like named plan Subsets with "(1)" in the filename are the correct versions.

The Bid Proposal Form is not affected by these changes.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.

NOTICE TO CONTRACTOR - SUBMITTALS

Unless otherwise noted, the Designer will be the "submittal reviewer."

Any Product Samples that are to be sent to the Designer requiring review for conformance with the Contract shall be transmitted by letter and hand delivered or sent by mail directly to Mr. Christopher Bonsignore, P.E., Transportation Principal Engineer, Facilities Design, Bureau of Engineering and Construction, Connecticut Department of Transportation, 2800 Berlin Turnpike, P.O. Box 317546, Newington, CT 06131-7546, Room 3405.

The Engineer will be the "submittal reviewer" for the following materials:

Concrete Mix Design Certifications
Asphalt Mix Design Certifications
Erosion Control Plan and Materials
Demolition Plan
Disposal Plan
Welding (Welder) Certificates
Certified Test Reports, Material Certificates, etc. from Form 818 Standard Items (non "A" Items from Bid List)
"Non-A" items, including those items in CSI-formatted Specifications
All test reports identified in CSI-formatted Specification except for Testing, Adjusting, and Balancing Reports

Environmental Compliance will be the "submittal reviewer" for review of work identified in the following special provisions:

1. Item No. 0020801A – Asbestos Abatement.
2. Item No. 0020902A – Lead Compliance for Building Demolition and Renovation.
3. Item No. 0100072A – Removal and Disposal of Underground Tanks.
4. Item No. 0100069A – Removal of Tanks
5. Item No. 0101000A – Environmental Health and Safety.
6. Item No. 0101117A – Controlled Materials Handling.
7. Item No. 0101128A – Securing, Construction and Dismantling of a Waste Stockpile and Treatment Area.
8. Item No. 0101143A – Handling and Disposal of Regulated Items.
9. Item No. 0101185A – Removal of Hydraulic Systems .
10. Item No. 0101186A – PCB Building Materials Removal.
11. Item No. 0202315A – Disposal of Controlled Materials.
12. Item No. 0202640A – 2-Inch Monitoring Well Abandonment.
13. Item No. 0202642A – Abandonment of Wells.
14. Item No. 0204213A – Handling Contaminated Groundwater.
15. Item No. 0999002A – Disposal of Buildings.

FM Global is identified as an outside agency as a secondary "submittal reviewer" for review of work are identified in the following CSI Sections:

1. Division 05 Section 053100, "Steel Decking."
2. Division 07 Section 074213, "Metal Wall Panels."
3. Division 07 Section 075419, "Polyvinyl Chloride (PVC) Roofing."
4. Division 07 Section 077100, "Roof Specialties."
5. Division 07 Section 078413, "Penetration Firestopping."
6. Division 07 Section 078446, "Fire-Resistive Joint Systems."
7. Division 07 Section 083323, "Overhead Coiling Doors."
8. Division 07 Section 083613, "Sectional Doors."
9. Division 10 Section 105700, "Bay Furnishings."
10. Division 11 Section 111000, "Vehicle Service Equipment."
11. Division 13 Section 133419, "Metal Building Systems."
12. Division 21, Section 211313, "Wet-Pipe Sprinkler Systems"
13. Division 28 Section 283111, "Digital, Addressable Fire-Alarm System."

The Department will forward the noted submittals to FM Global for their review, with FM Global comments being sent back to the Department for inclusion in one response to the Contractor. Hence, the Contractor shall allow 28 calendar days for outside agency review of the submittals noted above.

*The Contractor shall send submittals e-mail alerts to the following key personnel:

Designer (Project Engineer):
Designer (Project Manager):
Designer (Consultant Project Manager):
Construction Project Chief Inspector:
Construction Supervising Engineer:
Owner:
Operator:

Add the following for submittals where Environmental Compliance is listed in NOTICE TO CONTRACTOR – SUBMITTALS as the "submittal reviewer:"

Environmental Designer (Project Engineer):
Environmental Designer (Project Manager):

*Key construction and engineer personnel will be identified at the Pre-Construction Meeting.

SECTION 105700 - BAY FURNISHINGS

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:

A. Shelving and Bin Storage
B. Storage Cabinets
C. Work Benches

1.2 PERFORMANCE REQUIREMENTS:

A. Structural Performance for Post-and-Beam Metal Storage Shelving: Capable of withstanding the loads indicated according to MH 28.2.

B. Seismic Performance: Metal storage shelving shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

A. Seismic Component Importance Factor: 1.5.

C. FM Global Approvals' Listing: Furnish FM Global approved Combustible Cabinets.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 818 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product indicated. Include rated capacities, construction details, material descriptions, dimensions of individual components and profiles, and finishes for metal storage shelving.

C. Shop Drawings: For customized metal storage shelving. Include plans, elevations, sections, details, and attachments to other work. Include installation details of connectors, lateral bracing, and special bracing.

D. Product Schedule: For metal storage shelving. Use same designations indicated on Plans.

E. Qualification Data: For qualified professional engineer.

1.4 QUALITY ASSURANCE:

A. Source Limitations: Obtain metal storage shelving from single source from single manufacturer in accordance with Form 818 Article 1.20-1.06.01.

B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

1.5 DELIVERY, STORAGE, AND HANDLING:

A. Refer to Form 818 Article 1.06.03 and Form 818 Article 1.20-1.06.03 for additional information.

B. Environmental Limitations: Do not deliver or install metal storage shelving until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.6 COORDINATION:

A. Coordinate sizes and locations of blocking and backing required for installation of metal storage shelving attached to wall and ceiling assemblies.

B. Coordinate locations and installation of metal storage shelving that may interfere with ceiling systems including lighting, HVAC, speakers, sprinklers, access panels, electrical switches or outlets, and floor drains.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Steel Tubing: ASTM A 513, Type 2.

C. Stainless-Steel Tubing: ASTM A 554, Grade MT-304.

D. Steel Wire: ASTM A 899.

2.2 SHELVING:

A. Boltless Metal Storage Shelving “A”: Factory-formed, field-assembled, freestanding system, designed for shelves to span between and be supported by corner posts, with shelves adjustable over the height of shelving unit. Fabricate

initial shelving unit with a post at each corner. Fabricate additional shelving units similarly, so each unit is independent as add-on units, designed to share two corner posts with initial shelving unit. Provide fixed top and bottom shelves, adjustable intermediate shelves, and accessories indicated.

a. Basis-of-Design Product: Subject to compliance with requirements, provide boltless shelving, as supplied by Grainger Item #1PWX5, EDSAL Model #HCU-963696, or an approved equal.
b. Load-Carrying Capacity per Shelf: 2600lbs.
c. Posts: Fabricated from cold-rolled steel; in manufacturer's standard shape; with perforations at 1-1/2 inches (38 mm) o.c. to receive shelf-to-post connectors.
    1) Steel Thickness, Nominal: 14-ga.

d. Solid-Type Shelves: Fabricated from steel sheet as follows:
    1) Steel-Sheet Thickness, Nominal: 16-ga.

e. Overall Unit Width: 96 inches
f. Overall Unit Depth: 36 inches.
g. Overall Unit Height: 96 inches.
h. Quantity:
    1) Maintenance: 4
    2) Signs and Markings: 2

B. Bin Storage Shelving – 13 Bins 'B': Factory-formed, field-assembled, freestanding system without back or end panels, designed for shelves to span between and be supported by corner posts, with shelves adjustable over the entire height of shelving unit. Fabricate initial shelving unit with a post at each corner. Fabricate additional shelving units similarly, so each unit is independent as add-on units, designed to share two corner posts with initial shelving unit. Provide fixed top and bottom shelves, adjustable intermediate shelves, and accessories indicated.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Blue Bins and Shelving as supplied by Grainger Item #1UVT5, QUANTUM STORAGE SYSTEMS Model #WR6-973974BL, or an approved equal.
b. Total Load-Carrying Capacity: 5000 lbs.
c. Posts: Manufacturer's standard steel post with notches.
d. Shelf Quantity: Four shelves per shelving unit in addition to top and bottom shelf.
e. Shelf-to-Post Connectors: Manufacturer's standard one-piece collet (wedge), designed to engage post collar attached to shelves.
f. Bracing: Manufacturer's standard diagonal cross bracing, as required for stability, load-carrying capacity of shelves, and number of shelves.
g. Overall Unit Width: 36 inches.
h. Overall Unit Depth: 30 inches.
i. Overall Unit Height: 74 inches.

j. Accessories:
   1) Shelf Inlay: Manufacturer's standard Blue Bins.

k. Quantity:
   1) Maintenance: 4
   2) Signs and Markings:1

C. Bulk Storage Rack Metal Storage Shelving "S': Factory-formed, field-assembled, freestanding system designed for shelves to span between and be supported by end frames, with shelves adjustable over the entire height of shelving unit.

a. Basis-of-Design Product: Subject to compliance with requirements, provide Bulk Storage Rack as supplied by Grainger Item # 10Z449, EDSAL Model #ERW482472S, or an approved equal.
b. Load-Carrying Capacity per Shelf: 3800 lbs.
c. Welded Upright Frame: Manufacturer's standard post and bracing, frame construction with notches and footplates.
d. Pallet Rack Beam: Manufacturer's standard steel beam designed to engage post notches on upright frames.
e. Framed-Type Wire Shelves: Manufacturer's standard wire decking construction with metal plated decking.
f. Overall Unit Width: 48 inches.
g. Overall Unit Depth: 24 inches.
h. Overall Unit Height: 72 inches.
i. Quantity:
   1) Paint Storage: 24

D. Steel Pallet Rack "P": Basis-of-Design Product: Subject to compliance with requirements, provide Pallet Rack Starter Unit as supplied by Grainger Item #59LA59, HUSKY RACK & WIRE Model #41D992, or an approved equal.

a. Total Load-Carrying Capacity: 19,380 lbs.
b. Overall Unit Width: 96 inches.
c. Overall Unit Depth: 48 inches.
d. Overall Unit Height: 96 inches.
e. Quantity:
   1) Paint Storage: 5

2.3 STORAGE CABINET:

A. Combustible Cabinet "C": Factory-formed, freestanding system.

a. Basis-of-Design Product: Subject to compliance with requirements, provide storage cabinet supplied by Ford & Ulrich part Justrite Sure-Grip EX Safety Cabinet model #H896000, or an approved equal.
b. Construction: Steel construction, powder coated Yellow finish with 2 doors and 2 shelves.

c. Overall Unit Width: 34 inches.
d. Overall Unit Depth: 34 inches.
e. Overall Unit Height: 65 inches.
f. Quantity:
    1) Maintenance: 3
    2) Signs and Markings: 5

2.4 WORK BENCH:

A. Work bench, Steel, Gray "WB": Factory assembled, freestanding work bench with wooden butcher block top. Steel construction with a powder coated finish.

A. Basis-of-Design Product: Subject to compliance with requirements, provide work bench(es), as supplied by Grainger Item #7D198, GRAINGER APPROVED Model #M5333, or an approved equal.

a. Steel Thickness, Nominal: 14-ga.
b. Top Thickness: 1-3/4 inches.

B. Overall Unit Width: 72 inches.
C. Overall Unit Depth: 36 inches.
D. Overall Unit Height: 34 inches.
E. Quantity:

a. Maintenance: 2
b. Signs and Markings: 3

2.5 FABRICATION:

A. Shop Fabrication: Prefabricate shelving components in shop to greatest extent possible to minimize field fabrication; temporarily preassemble shelving components where necessary to ensure that field-assembled components fit together properly. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Fabricate metal storage shelving square and rigid, with posts plumb and true and shelves flat and free of dents or distortion. Fabricate connections to form a rigid structure, free of buckling and warping.

C. Form metal in maximum lengths to minimize joints. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

D. Form edges and corners free of sharp edges or rough areas. Fold back and crimp exposed edges of unsupported sheet metal to form a 1/2-inch wide hem on the

concealed side; ease edges of metal plate to radius of approximately 1/32 inch. Shear and punch metals cleanly and accurately. Remove burrs.

E. Weld corners and seams continuously to develop strength, minimize distortion, and maintain the corrosion resistance of base metals. At exposed locations, finish welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface. Weld before finishing components to greatest extent possible. Remove weld spatter and welding oxides from exposed surfaces before finishing.

2.6 GENERAL FINISH REQUIREMENTS:

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.7 STEEL FINISHES:

A. Surface Preparation: Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning" or SSPC-SP 8, "Pickling."

B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry thickness.

2.8 STAINLESS-STEEL FINISHES:

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine floors for suitable conditions where metal storage shelving will be installed.

C. Examine walls to which metal storage shelving will be attached for properly located blocking, grounds, or other solid backing for attachment of support fasteners.

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

3.2 PREPARATION:

A. Vacuum finished floor and wet mop flooring over which metal storage shelving is to be installed.

3.3 INSTALLATION:

A. Install metal storage shelving level, plumb, square, rigid, true, and with shelves flat and free of dents or distortion. Make connections to form a rigid structure, free of buckling and warping.

A. Install exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible.
B. Install braces, straps, plates, brackets, and other reinforcements as needed to support shelf loading and as required for stability.
C. Adjust post-base bolt leveler to achieve level and plumb installation.
D. Install seismic restraints.
E. Connect side-to-side and back-to-back shelving units together.
F. Install shelves in each shelving unit at spacing indicated on Plans or, if not indicated, at equal spacing.

a. Post-and-Beam Metal Storage Shelving: Install beams with beam-to-post connectors fully engaged in post perforations.

B. Install bins.

3.4 ERECTION TOLERANCES:

A. Erect metal storage shelving to a maximum tolerance from vertical of 1/2 inch in up to 10 feet of height, not exceeding 1 inch for heights taller than 10 feet.

B. Erect post-and-beam metal storage shelving to a maximum tolerance from vertical of 1/4 inch in 84 inches of height.

3.5 ADJUSTING:

A. Adjust metal storage shelving so that connectors and other components engage accurately and securely.

B. Adjust and lubricate operable components to operate smoothly and easily, without binding or warping. Check and readjust operating hardware.

C. Touch up marred finishes or replace metal storage shelving that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by metal storage shelving manufacturer.

D. Replace metal storage shelving that has been damaged or has deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 105700

SECTION 113100 - APPLIANCES

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes the following:

1. Cooking equipment including:

a. Microwave oven.
b. Electric Range.

2. Refrigerator/freezer.

B. Related CSI Sections include the following:

1. Division 12 Section 123530, “Casework” for casework.
2. Division 23 Section 233813, “Commercial-Kitchen Hoods” for exhaust hood.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 818 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type of product indicated. Include operating characteristics, dimensions of individual appliances, and finishes for each appliance.

C. Maintenance Data: For appliances to include in the operation and maintenance manuals specified in Form 818 Article 1.20-1.08.14 subsection 4 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1.3 QUALITY ASSURANCE:

A. Source Limitations: Obtain appliances through one source from a single manufacturer in accordance with Form 818 Article 1.20-1.06.01.

1. Provide products from same manufacturer for each type of appliance required.

B. Regulatory Requirements: Comply with provisions of the following product certifications:

1. NFPA: Provide electrical appliances listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2. UL and NEMA: Provide electrical components required as part of appliances that are listed and labeled by UL and that comply with applicable NEMA standards.
3. NAECA: Provide appliances that comply with NAECA standards.

C. Regulatory Requirements, Accessibility: Where residential appliances are indicated to comply with accessibility requirements, comply with ANSI A117.1.

1. Operable Parts: Provide controls with forward reach no higher than 48 inches above the floor, horizontal front reach no more than 25 inches, horizontal side reach no more than 24 inches, and that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.
2. Refrigerator/Freezer: Provide 50 percent of freezer space within 54 inches of the floor.

D. Energy Ratings: Provide residential appliances that carry labels indicating energy-cost analysis (estimated annual operating costs) and efficiency information as required by the FTC Appliance Labeling Rule.

1. Provide appliances that qualify for the EPA/DOE ENERGY STAR product labeling program.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufacturers that may be incorporated into the Work include, but are not limited to, manufacturers specified.

1. General Electric Company.
2. Whirlpool.

2.2 COOKING APPLIANCES:

A. Microwave Oven:

1. Oven(s): Standard features include the following:

a. Oven Capacity: 2.0 cu. ft.
b. Oven Features: Digital control panel with timer display, turntable, and temperature probe.
c. Mounting: Freestanding.
d. Electrical Power: 1000 W.
e. Color: White.

B. Electric Range: ADA compliant slide-in range with one oven and complying with AHAM ER-1.

1. Width: 30 inches.
2. Electric Burner Elements: Four minimum.

    a. Radiant Type: Two 1200 W minimum and two 2000 W elements.
    b. Controls: Digital panel controls, located on front panel of range top.

3. Oven Features:

    a. Capacity: 4.8 cu. ft. minimum.
    b. Operation: Baking and pyrolytic self-cleaning.
    c. Broiler: Located in top of oven.
    d. Oven Door: Counterbalanced, removable, with observation window and full-width handle.
    e. Electric Power Rating:

        1) Oven(s): 2400 W minimum.
        2) Broiler: 3400 W minimum.

    f. Controls: Digital panel controls and timer display, located on front panel of range top.
    g. Integral backsplash.

4. Anti-Tip Device: Manufacturer's standard.
5. Electric Power Supply: As indicated on Electrical Drawings.
6. Material: Manufacturer's standard cooktop.

    a. Color/Finish: White.

7. Comply with accessibility requirements.

2.3 REFRIGERATION APPLIANCES:

A. Refrigerator/Freezer:

1. Type: Freestanding, frost-free, side-by-side refrigerator/freezer.
2. Storage Capacity:

    a. Fresh Food Compartment Volume: 16.5 cu. ft.
    b. Freezer Volume: 9.5 cu. ft.
    c. Shelf Area: 3 adjustable glass shelves, 26 sq. ft.

3. Refrigerator Features:

    a. Compartment Storage: Vegetable crisper, Meat compartment.
    b. Door Storage: Dairy compartment, Modular compartments.

4. Freezer Features:

   a. Ice storage bins.
   b. Automatic icemaker and storage bin.
   c. Circulator fan.
   d. Ice and cold-water dispenser in the door.

5. Energy Consumption: Measured and certified by AHAM HRF-1 at not more than 688 kWh/year under average conditions for a refrigerated volume of 17.9 cu. ft.
6. Temperature Controls: Separate temperature controls for each compartment and with switch for condensation-control heating element at freezer opening.
7. Appliance Color: White.

2.4 FINISHES, GENERAL:

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Color-Coated Finish: Provide appliances with manufacturer's standard finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, color, gloss, and minimum dry film thickness for painted finishes.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

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

3.2 INSTALLATION, GENERAL:

A. General: Comply with manufacturer's written instructions.

B. Freestanding Equipment: Place units in final locations after finishes have been completed in each area. Verify that clearances are adequate to properly operate equipment.

C. Utilities: Refer to CSI Division 22 for plumbing requirements and CSI Division 26 for electrical requirements.

D. Range Anti-tip Device: Install at each range according to manufacturer's written installation.

3.3 CLEANING AND PROTECTION:

A. Test each item of appliances to verify proper operation. Make necessary adjustments.

B. Verify that accessories required have been furnished and installed.

C. Remove packing material from appliances and leave units in clean condition, ready for operation.

END OF SECTION 113100

SECTION 262413 - SWITCHBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Service and distribution switchboards rated 600 V and less.
2. Disconnecting and overcurrent protective devices.
3. Accessory components and features.
4. Identification.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of switchboard, accessories, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

B. Shop Drawings: For each switchboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types.
3. Detail bus configuration, current, and voltage ratings.
4. Detail short-circuit current rating of switchboards and overcurrent protective devices.
5. Include descriptive documentation of optional barriers specified for electrical insulation and isolation.
6. Include evidence of NRTL listing for series rating of installed devices.
7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
8. Include time-current coordination curves for each type and rating of overcurrent protective device included in switchboards. Submit on translucent log-log graft paper; include selectable ranges for each type of overcurrent protective device.
9. Include schematic and wiring diagrams for power, signal, and control wiring.

1.3 SUBMITTALS

A. Submit the following in accordance with Form 818 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: For each type switchboard, accessory item, and component specified.

1. Spare Parts: Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted.

C. Shop Drawings: For switchboards. Include dimensioned plans, sections, and elevations. Show tabulations of installed devices, major features, and voltage rating. Include the following:

1. Enclosure type with details for types NEMA 250, Type 3R and others.
2. Bus configuration and current ratings.
3. Short-circuit current rating of switchboard.
4. Circuit breakers.
5. Features, characteristics, ratings, and factory settings of individual protective devices and auxiliary components.
6. Wiring Diagrams: Details of schematic diagram including control wiring and differentiating between manufacturer-installed and field-installed wiring.

D. Quality Assurance Submittals:

1. Qualification Data: For firms and persons specified in Part 1.4, "Quality Assurance."
2. Switchboard Schedules: For installation in switchboards. Submit final versions after load balancing.

E. Maintenance Data: For switchboard components to include in the operational and maintenance manuals specified in Article 1.20 – 1.08.14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS. Include manufacturer's written instructions for testing circuit breakers.

F. Qualification Data: For qualified Independent Testing agency.

G. Field Quality-Control Reports:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Independent agency company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain switchboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards including clearances between switchboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NEMA PB 2.

F. Comply with NFPA 70.

G. Comply with UL 891.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver switchboards in sections or lengths that can be moved past obstructions in delivery path.

B. Remove loose packing and flammable materials from inside switchboards and keep switchboards to prevent condensation.

C. Handle and prepare switchboards for installation according to NECA 400 and NEMA PB 2.1.

1.6 PROJECT CONDITIONS

A. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.

B. Environmental Limitations:

1. Do not deliver or install switchboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above switchboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:

    a. Ambient Temperature: Not exceeding 104 deg F.
    b. Altitude: Not exceeding 6600 feet.

C. Service Conditions: NEMA PB 2, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet.

D. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Engineer no fewer than fourteen days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Engineer’s written permission.

4. Comply with NFPA 70E.

1.7 COORDINATION

A. Coordinate layout and installation of switchboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS (Siemens or approved equal)

2.1 MANUFACTURED UNITS (Siemens or approved equal)

22000 1 800A W/560A FEED--SB2 SWITCHBOARD - 2 SECTIONS

SB2, Material group 3: VD5, Incoming Location: Bottom, Incoming Position: Left, Service Entrance: Yes, System: 480Y/277 3Ø4W WYE AC, 65,000 A, Bus Bracing: 65,000 A, Bus Material: 65°C Copper, Bus Rating: Non-Tapered, Incoming Bus Amperage: 800 A, Enclosure Rating: 3R - Outdoor(w/gaskets), Flat Roof.

SECT.1-MAIN

Section Type: Main Service.

- 1 - Standard Frame
- 1 - Master Nameplate
- 1 - Rodent Resistant
- 1 - 800 Copper Section Bus
- 1 - 800 Amp Top Thru Bus
- 1 - 65°C Copper Neutral
- 1 - Outdoor Construction, Flat Roof, 4.125 Front Extension
- 1 - 500 Kcmil Al/Cu 400-800A Mechanical Lugs
- 1 - Copper Ground Bus
- 1 - Section Barrier
- 1 - (1)#6-300MCM Ground Lug
- 1 - INCOMING LUGS: (3) 500 KCMIL AL/CU MECH
- 1 - Wire Marker Labels

1 - Eversource Energy UTILITY METERING COMPARTMENT

- 1 - 800A Cold Sequence Utility Meter Provision (CU)

1 - 800 A/3P HMX Main Breaker

- 1 - Catalog #: HMX3B800
- 1 - 800 A/3P HMX
- 1 - Model 525 Trip Unit
- 1 - Handle padlocking device
- 1 - Shunt Trip, Control Power by Siemens

SECT.2-DISTRIBUTION

Section Type: Distribution Panel.

1 - Standard Frame
1 - Rodent Resistant
1 - 800 Copper Section Bus
1 - 800 Amp Top Thru Bus
1 - Outdoor Construction, Flat Roof, 4.125 Front Extension
1 - Copper Ground Bus
1 - 800 Amp Interconnection Components

1 - 600 A/3P 3VA64-HLAE Branch
1 - Catalog #: 3VA64606HN310AA0
1 - 600 A 3VA64
1 - 600 A Sensors
1 - 600 A Trip Setting
1 - Model ETU350 Trip Unit LSI
1 - Short Time Trip
1 - (2)2/0-500 KCMIL CU/AL

1 - 20 A/1P 3VA41-HEAB Branch
1 - Catalog #: 3VA41206ED140AA0
1 - 20 A/1P 3VA41
1 - Model TM210 FTFM
1 - (1)#14-3/0 KCMIL CU/AL

A. Front- and Side-Accessible Switchboards:

1. Main Devices: Fixed, individually mounted.
2. Branch Devices: Panel mounted.
3. Sections front and rear aligned.

B. Nominal System Voltage: 480Y/277 V

C. Main-Bus Continuous: 800A

D. Indoor Enclosures: Steel, NEMA 3R

E. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray to match existing switchgear finish over a rust-inhibiting primer on treated metal surface.

F. Barriers: Between adjacent switchboard sections.

G. Insulation and isolation for main bus of main section and main and vertical buses of feeder sections.

H. Utility Metering Compartment: Fabricated, barrier compartment and section complying with utility company's requirements; hinged sealed door; buses provisioned for mounting utility company's current transformers and potential transformers or potential taps as required by utility company. If separate vertical section is required for utility metering, match and align with basic switchboard. Provide service entrance label and necessary applicable service entrance features.

I. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.

J. Hinged Front Panels: Allow access to circuit breaker, metering, accessory, and blank compartments.

K. Pull Box on Top of Switchboard:

1. Adequate ventilation to maintain temperature in pull box within same limits as switchboard.
2. Set back from front to clear circuit-breaker removal mechanism.
3. Removable covers shall form top, front, and sides. Top covers at rear shall be easily removable for drilling and cutting.
4. Bottom shall be insulating, fire-resistive material with separate holes for cable drops into switchboard.
5. Cable supports shall be arranged to facilitate cabling and adequate to support cables indicated, including those for future installation.

L. Buses and Connections: Three phase, four wire unless otherwise indicated.

1. Phase- and Neutral-Bus Material: Hard-drawn copper of 98 percent conductivity, silver-plated with tin-plated aluminum or copper feeder circuit-breaker line connections.
2. Load Terminals: Insulated, rigidly braced, runback bus extensions, of same material as through buses, equipped with mechanical connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full-ampere rating of circuit-breaker position.
3. Ground Bus: 1/4-by-2-inch, hard-drawn copper of 98 percent conductivity, equipped with mechanical connectors for feeder and branch-circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run.
4. Main Phase Buses and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends.
5. Neutral Buses: 100 percent of the ampacity of phase buses unless otherwise indicated, equipped with mechanical connectors for outgoing circuit neutral cables. Brace bus extensions for busway feeder neutral bus.
6. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.

M. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.

N. Bus-Bar Insulation: Factory-applied, flame-retardant, tape wrapping of individual bus bars or flame-retardant, spray-applied insulation. Minimum insulation temperature rating of 105 deg C.

O. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components including instruments and instrument transformers.

2.2 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with fully rating interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

    a. Instantaneous trip.
    b. Long- and short-time pickup levels.
    c. Long- and short-time time adjustments.
    d. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker; trip activation on fuse opening or on opening of fuse compartment door.
6. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.
    b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor material.
    c. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.

2.3 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: For testing functions of solid-state trip devices without removing from switchboard. Include relay and meter test plugs suitable for testing switchboard meters and switchboard class relays.

C. Portable Circuit-Breaker Lifting Device: Floor-supported, roller-based, elevating carriage arranged for movement of circuit breakers in and out of compartments for present and future circuit breakers.

D. Overhead Circuit-Breaker Lifting Device: Mounted at top front of switchboard, with hoist and lifting yokes matching each drawout circuit breaker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receive, inspect, handle, and store switchboards according to NECA 400 and NEMA PB 2.1.

B. Examine switchboards before installation. Reject switchboards that are moisture damaged or physically damaged.

C. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.2 INSTALLATION

A. Install switchboards and accessories according to NECA 400 or NEMA PB 2.1.

Equipment Mounting: Install switchboards to match existing conditions.

1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to switchboards.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.

C. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.

D. Install filler plates in unused spaces of panel-mounted sections.

E. Install overcurrent protective devices, transient voltage suppression devices, and instrumentation.

1. Set field-adjustable switches and circuit-breaker trip ranges.

F. Comply with NECA 1.

3.3 CONNECTIONS

A. Comply with requirements for terminating feeder bus specified in the Contract Documents. Indicate general arrangement of bus, fittings, and specialties.

B. Comply with requirements for terminating conductors and conduits in switchboard as indicated in Contract Documents.

3.4 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with requirements for identification specified in CSI Section 260553 "Identification for Electrical Systems."

B. Switchboard Nameplates: Label each switchboard compartment with a nameplate complying with requirements for identification specified in CSI Section 260553 "Identification for Electrical Systems."

C. Device Nameplates: Label each disconnecting and overcurrent protective device and each meter and control device mounted in compartment doors with a nameplate complying with requirements for identification specified in CSI Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing agency to perform tests and inspections. Inspect components, assemblies, and equipment installations, including connections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Acceptance Testing Preparation:

1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
2. Test continuity of each circuit.

D. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, perform an infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchboard a month after date of Substantial Completion.
    c. Instruments and Equipment:

        1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

E. Switchboard will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports, including a certified report that identifies switchboards included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain switchboards, overcurrent protective devices, instrumentation, and accessories.

END OF SECTION 262413

SECTION 262713 - ELECTRICITY METERING

PART 1 - GENERAL.

1.1 SUMMARY:

A. This Section includes electricity-metering components and coordination with electrical utilities.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 818 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR SUBMITTALS.

B. Shop Drawings for Electricity-Metering Equipment:

1. Dimensioned plans and sections or elevation layouts.
2. Wiring Diagrams: Power, signal, and control wiring specific to this Project. Identify terminals and wiring designations and color codes to facilitate installation, operation, and maintenance. Indicate recommended types, wire sizes, and circuiting arrangements for field-installed wiring, and show circuit protection features.
3. Mounting and anchoring devices recommended by manufacturer to resist seismic forces.

C. Test and Inspection reports performed by an independent agency.

1.3 QUALITY ASSURANCE

A. Testing Agency Qualifications: Independent agency company of NETA or an NRTL.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain main disconnect switch, overcurrent protective devices, components, and accessories from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for main disconnect switch including clearances between main disconnect switch and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NEMA PB 1.

1.4 DELIVERY, STORAGE, AND HANDLING:

A. Receive, store, and handle modular meter center as specified in NECA 400.

1.5 COORDINATION:

A. Coordinate electrical service connections to components furnished by utility companies.

1. Coordinate installation and connection of exterior underground utilities and services, including provision for electricity-metering components.
2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
3. Coordinate the installation of new service by minimizing the power outage to the existing service.

B. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces.

C. Electrical Service: Electric underground service conductors shall be furnished and installed by the utility company. Eversource shall provide and install proposed utility pad mounted transformers. The pad mounted utility transformers shall be rated 120/208 volts, 3 phase, (800A for Maintenance, 600A for Signs and Marking) and 277/480 volts, 3 phase 800A for Level 3 EV Charging. There is an Eversource utility charge for installation and connection of primary cable from existing utility pole to proposed pad mounted transformers. All conduits, pull string, secondary service, grounding, new meter sockets and associated conduit shall be supplied and installed by the Contractor. The utility company shall supply the meters. The Eversource charge of $12,688.52 shall be included in the contract bid price. This amount also includes the service connections to the facility by the utility company.

D. Temporary Electrical Service: The temporary work includes the installation of a 120/208 volt, 3 phase, 200A service. Location of the transformer is indicated on the plans or as determined by the utility company. The contractor shall coordinate the installation of the temporary meter and tripod. The Eversource charge of $1000 shall be included in the contract bid price. This amount includes the temporary service connections to the facility by the utility company. All conduits, pull string, secondary service, grounding, meter socket and associated conduit shall be supplied and installed by the Contractor.

E. All bidders will include the above amounts in Item No. 1700001A – Service Connections (Estimated Cost) along with costs for work by other utilities.

F. The Contractor shall call “Call Before You Dig!” at 811 or (800) 922-4455, before any excavation takes place. Contractor shall coordinate excavation with paving operation.

PART 2 - PRODUCTS

2.1 EQUIPMENT FOR ELECTRICITY METERING:

A. Current-Transformer Cabinets: Comply with requirements of electrical power utility company.

B. Meter Sockets: Comply with requirements of electrical power utility company.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following.

a. Cutler-Hammer; Eaton Corporation.
b. General Electric Company; Electrical Distribution & Control Div.
c. Siemens Energy & Automation, Inc.
d. Square D; Schneider Electric.

2. Housing: NEMA 250, Type 1 or 3R enclosure, depending on the location.

a. Structural strength of the housing, its anchorage and component attachment provisions, and anchorage devices recommended for anchoring the housing in place shall be adequate to prevent separation of equipment and its components from their installed positions.

b. Identification: Complying with CSI Division 26 Section 260553, "Identification for Electrical Systems."
c. Physical Protection: Tamper resistant, with hasp for padlock.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION:

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION:

A. All enclosures shall comply with Section 260533 “Raceways and Boxes for Electrical Systems”.

B. Support clamps shall comply with Section 260529 “Hangers and Supports for Electrical Systems”.

3.3 SUPPORT INSTALLATION:

A. Supports shall comply with Section 260529 “Hangers and Supports for Electrical Systems”.

3.4 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT:

A. Install equipment according to utility company's written requirements. Provide grounding, empty conduits, and pullwire as required by utility company. Contractor shall only run conduit under slab of building for conduits penetrating the building and routed from the outside. Conduits within the building shall not be run in slab unless otherwise indicated.

B. Metering enclosure per Electric Utilities’ specifications. The meter is to be located outside the building wall within 50 feet of the main switch.

C. All service entrance equipment including the appropriate size and type of conduit and service entrance conductors per the NEC and local authority having jurisdiction.

3.5 FIELD QUALITY CONTROL:

A. Testing Agency: Engage a qualified independent testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Prepare for acceptance tests as follows:

1. Test insulation-resistance tests of main switch disconnect, main circuit breaker, component, connecting supply, feeder, and control circuits.
2. Test continuity tests of each circuit.

D. Testing: After installing main switch disconnect and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers or per manufacturer's written testing instructions. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.
3. Perform the following infrared scan tests and inspections and prepare reports:

    a. Initial Infrared Scanning: After Substantial Completion, perform an infrared scan of each main switch disconnect. Remove front panel so joints and connections are accessible to portable scanner.
    b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each main switch disconnect after the semi-final inspection.
    c. Instruments and Equipment:
        1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

E. Main Disconnect Switch will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports, including a certified report that identifies Main Disconnect Switch included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.6 CLEANING:

A. On completion of installation, inspect interior and exterior of panelboards. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

END OF SECTION 262713

SECTION 262729 - ELECTRIC VEHICLE CHARGING STATION

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes Electric car charging stations, including the as shown on the plans.

B. Related CSI Sections include the following:

1. Division 26 Section 260519, “Low Voltage Electrical Power Conductors and Cables”.
2. Division 26 Section 260529, “Hangers and Supports for Electrical Systems”.
3. Division 26 Section 260533, "Raceways and Boxes for Electrical Systems".
4. Division 26 Section 260543, “Underground Ducts and Raceways for Electrical Systems”.
5. Division 26 Section 262726, “Wiring Devices.”

C. Description: Electric car charging stations, including the following:

1. Garage overhead motorized chargers.
2. Motorized EVSE with auto-coil cable retraction.
3. Non-motorized wrapped cable chargers.
4. Payment module for charging stations.
5. Testing devices.
6. Control modules.

1.2 SUBMITTALS:

A. Submit the following in accordance with Form 818 Article 1.20-1.05.02 and NOTICE TO CONTRACTOR SUBMITTALS.

1. Product Data: Include illustrations, specifications, schedules, and material lists with quantities showing complete details of all proposed equipment.

B. Maintenance Data: For EV charging Stations to include in the operation and maintenance manuals specified in Form 818 Article 1.20-1.08-14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1.3 DEFINITIONS:

A. Electric vehicle charging station: A public or private parking space that is served by battery charging station equipment that has as its primary purpose the transfer of electric energy by conductive or inductive means to a battery or other energy storage device in an electric vehicle. An electric vehicle charging station equipped with Level 1

or Level 2 charging equipment is permitted outright as an accessory use to any principal use.

B. Electric vehicle infrastructure: structures, machinery, and equipment necessary and integral to support an electric vehicle, including battery charging stations, rapid charging stations, and battery exchange stations.

C. EV: Electric vehicle

D. EVSE: Electric vehicle supply equipment

E. Level 1 Charging Station: EVSE that supplies slow charging. Typically operates on a 15- or 20-amp circuit breaker on a 120-volt alternating current (AC) circuit and standard outlet.

F. Level 2 Charging Station: EVSE that supplies medium charging. Typically operates on a 40 amp to 100-amp circuit breaker on a 208- or 240-volt AC circuit.

G. Level 3 Charging Station: EVSE that supplies fast or rapid charging. Typically operates on a sixty amp or higher dedicated breaker on a 480 volt or higher three-phase circuit with special grounding equipment.

1.4 QUALITY ASSURANCE:

A. Referenced Standards:

1. American National Standards Institute (ANSI).
2. National Electrical Manufacturers Association (NEMA).
3. Society of Automotive Engineers (SAE):

    a. SAE J1772, Electric Vehicle Conductive Charge Coupler standard
    b. SAE J2293, Requirements for EV and the off-board EVSE used to transfer electrical energy to an EV from a utility source
    c. SAE J2847, Digital communication requirements
    d. SAE J2836, Digital communications between vehicle and EVSE
    e. SAE J551, Standards for electromagnetic compatibility

4. National Fire Protection Association (NFPA):

    a. 70, National Electrical Code (NEC).

        1) Article 625 Electric Vehicle Charging and Supply Equipment Systems
        2) Section 110-10 Circuit Impedance and Other Characteristics

5. Underwriters Laboratories, Inc. (UL).

a. UL 991, Standard for Tests for Safety Related Controls Employing Solid State Devices
b. UL 2202, Electric Vehicle Charging System Equipment
c. UL 2231-1, Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: General Requirements
d. UL 2231-2, Personnel Protection Systems for Electric Vehicle (EV) Supply Circuits: Particular Requirements for Protection Devices for Use in Charging Systems
e. UL 2251, Plugs, Receptacles, and Couplers for Electric Vehicles
f. UL 2594, Standard for Electric Vehicle Supply Equipment

6. American Society of Civil Engineers (ASCE):

a. ASCE/SEI 7 Minimum Design Loads for Buildings and Other Structures

1.5 WARRANTIES:

A. Refer to 818 Article 1.20 – 1.06.08 and NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.

B. All EV charging stations and components shall carry a manufacturer's warranty covering defects in material and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Level 2 – EVSE LLC, a subsidiary of Control Module, Inc, no equals shall be permitted.
2. Level 3 DC fast charging – Tritium or approved equal.

2.2 ELECTRIC VEHICLE SUPPLY EQUIPMENT:

A. General:

1. Charger to be capable of charging one or two vehicles, as indicated on Drawings. Dual dispensers must be capable of operating simultaneously.
2. Charger will be operated by state staff for fleet charging only. Payment options are not required. Charger to be operated using RFID, payment module, and gateway module. Refer to the contract plans for requirements for each charging stations.

B. Level 2 – EVSE LLC (No Equals)

1. Ratings and Configurations

a. Mounting:

1) Pedestal-Mounted: As indicated on Drawings.
2) Wall-mounted: As indicated on Drawings.

b. Number of phases: Single
c. Frequency: 60 Hz. Input Power: 208 VAC/40 A
d. Input power connection: Line 1, line 2, and ground
e. Feeder circuit breaker: Two pole, 50A, non-GFCI type per charge port
f. Output Power: 208 VAC/40 A
g. Operating Temperature: -22°F to 131°F
h. Operating Humidity: Up to 95% at 122°F
i. NEMA 3R enclosure
j. Cable:

1) Connectors: SAE J1772 (CCS1)
2) Cable length/cord management: Minimum 15 FT
3) Management: retractable, integral with enclosure

k. User Interface:

1) Power available status indicator
2) Charging clinking blue indicator
3) System detected fault red status indicator

l. Authentication:

1) Type non-networked RFID/key fob
2) Programming radio frequency remote control
3) Payment module

m. Protection:

1) Overcurrent protection internal to the charger
2) Ground Fault Circuit Interrupter (GFCI) integral to the charger, CCID 5 mA, auto reset
3) Ground fault protection system test automatic at beginning of each charge cycle.
4) After loss of power, the chargers shall return to post-configuration state.

n. Network:

1) Chargers to have network capability for the following:

a) Cell service or Internet access for data exchange
b) Network Administrator
c) Manufacturer or Network Service Center

2) Transaction and bank network ability where required.
3) Capable of data reporting.
4) System to supply remote software upgrade function (i.e. firmware upgrade).
5) System to supply explicit error messages for a range of device and communication failures (e.g., unrecognized message, out of range/low signal strength, low battery level, feature not supported, meter faults, EVSE faults).
6) System shall acknowledge execution failure of request.
7) Capable of remote software updates that do not impact charging time (i.e., when vehicle is not connected to the chargers).

2. Ancillary equipment

a. All ancillary equipment integral to the charger shall be provided by the supplier. This shall include, but may not be limited to:

1) Communication software
2) Charge dispenser
3) Cable management
4) Mounting brackets or diagrams
5) Fasteners for securing equipment to mounting location
6) Gateway Module: Wall mounted or integrated with the EVSE. Gateway module is a Data router used to activate the EVSE and track the usage of EVSE. Gateway module communicates to EVSE using ZigBee Mesh. Gateway requires ethernet or cellular. If equipped with ZigBee communication to the EVSE, then a 24 VDC supply is provided to convert supplied 110 VAC to the required operating voltage.

C. Level 3 – Tritium PKM150 (with "better" options package) or approved equal

1. Power output:

a. Single Vehicle Charging: 150KW
b. Simultaneous Charging: 2 x 75kW

2. Output current:

a. Single Vehicle Charging: up to 350A
b. Simultaneous Charging: up to 400A (2 x 200A)

3. Supply input: 950VDC (DC Microgrid)
4. Charging Cable Current Ratings and connector type:

    a. CCS: 200A / 350A for each cord

5. RFID reader
6. Digital LCD screen
7. Cable length: 6m (19ft 8")
8. Charging cable management
9. Charge state indicator lights
10. Sensor package (Tilt, Door Ingress)
11. Simultaneous charging (A & B)
12. Fuse disconnect
13. Electrical protection: Over current, Over voltage, Under voltage, Short circuit, Surge protection, Protective earth continuity monitor.
14. Standard 2 year warranty
15. Output voltage:

    a. CCS: 150-920V DC

16. IP65 (NEMA 3R)
17. Efficiency: 95%
18. Power factor: >0.99
19. Total harmonic distortion (THD): <5%
20. Operating temperature: -35°C to +50°C (-31°F to +122°F) de-rating applies above +40°C
21. Storage temperature: -35°C to +70°C (-31°F to +158°F)
22. Communication protocol: OCPP v1.6J
23. Network connection: 3G/4G/Ethernet for network
24. Authentication method: RFID: MI-FARE ISO/IEC14443A/B, ISO/IEC15693, ISO/IEC18000-3, FeliCa, NFC
25. Enclosure construction: Aluminum double skin
26. EMC Emissions Certification: Immunity Class A, Emission Class B †
27. Safety compliance: cTUVus, NRTL Certified to UL 2202 and CSA C22.2 No. 107.1

D. DC Microgrid Rectifier – Tritium or approved equal (required for 150kw chargers and larger)

1. Shall be ordered to supply number of chargers indicated on plans

    a. Up to 4 chargers per rectifier.

2. Input voltage 480V 3P
3. Nominal current: 450A
4. Input Overvoltage: Category III
5. Surge protection: UL Listed Type 1 SPD In = 20kA, SCCR = 200kA, including backup fuse

6. Output voltage: 950VDC
7. Short circuit current rating: 18kA
8. Power factor (charging): >0.99
9. Total harmonic distortion (THD): <5%
10. Operating temperature: -35°C to +50°C (-31°F to +122°F) (with derating) 5-95% RH Non-Condensing
11. Communication protocol: OCPP v1.6J
12. Network connection: 3G/4G/Ethernet
13. IP55 (NEMA 3R)
14. Battery-backed UPS functionality for telemetry during power outage

2.3 MAINTENANCE MATERIALS

A. Provide manufacturer recommended maintenance material to Owner.

B. Supplier shall supply one set of product-specific tools for the project.

PART 3 - EXECUTION

3.1 GENERAL:

A. All chargers and dispensers to be capable of networking to Owner's charge tracking software.

3.2 EXAMINATION:

A. Examine areas and conditions under which Work is to be installed.

B. Notify the Engineer of conditions detrimental to the completion of the Work.

C. Do not proceed with the work until unsatisfactory conditions have been corrected.

D. Commencement of work indicates acceptance of areas and conditions.

E. EV Charging station will be considered defective if it does not pass operation tests and inspections.

3.3 INSTALLATION:

A. Install in accordance with manufacturer's instructions and recommendations and as indicated on the Drawings.

B. Coordinate with related and adjacent work.

3.4 FIELD QUALITY CONTROL:

A. Engage the manufacturer to perform commissioning and testing of all electric vehicle charging stations and respective devices such as payment modules, gateways, and RFID card readers.

B. Prepare test and inspection reports.

3.5 ADJUSTMENTS AND CLEANING:

A. Clean soiled surfaces in accordance with manufacturer's instructions.

B. Protect components from damage until completion of project.

C. Touch-up, repair or replace damaged products after Substantial Completion.

END OF SECTION 262729

SECTION 265619 – LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY:

A. This Section includes exterior lighting fixtures, LED lamps, drivers, and accessories for the complete outdoor lighting as shown on plans.

B. Related CSI Sections include the following:
1. Division 26, Section 260519, “Low Voltage Electrical Power Conductors and Cables”.
2. Division 26, Section 260529, “Hangers and Supports for Electrical Systems”.
3. Division 26, Section 260533, "Raceways and Boxes for Electrical Systems".
4. Division 26, Section 260543, “Underground Ducts and Raceways for Electrical Systems”.
5. Division 26, Section 260923, “Lighting Control Devices.”
6. Division 26, Section 262726, “Wiring Devices.”
7. Division 26, Section 265613, “Lighting Poles and Standards.”

C. Description:

1. The lighting system shall be compatible with the available voltage or as called for on the project plans. LED lighting, complete with drivers, shall be installed as shown on the plans.
2. Panelboards, fixtures, outlets, receptacles, switches and all other applicable lighting system components and details shall be as shown on the plans or as specified.
3. The plans show the location, number, size and type of lighting units and fixture schedule. All fixtures shall be UL listed.
4. Lighting plans are diagrammatic, with fixture outlets located approximately to scale but not dimensioned. Raceways are not generally shown. The Installer shall check lighting drawings against field conditions and the drawings of other disciplines for interferences and shall select and lay out locations for outlets and obtain approval for final locations from Engineer.
5. Fixtures to be installed in wet, damp, moist, corrosive or outdoor locations will be acceptable only when designed and manufactured specifically for outdoor, rugged, weatherproof services. Each part, component, nut, bolt, rivet and spring shall be made of materials of effective corrosion resistance or have been subjected to finishing treatment which will assure such resistance. Fixtures shall be certified by manufacturer for intended purpose.

1.2 DEFINITIONS:

A. CCT: Correlated Color Temperature.

B. CRI: Color Rendering Index.

C. Fixture: See "Luminaire."

D. IP: International Protection or Ingress Protection Rating.

E. Lumen: Measured output of lamp and luminaire, or both.

F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 SUBMITTALS:

A. Submit the following in accordance with Form 818 Article 1.20 – 1.05.02 and NOTICE TO CONTRACTOR – SUBMITTALS.

B. Product Data: Include photometric curves, illustrations, specifications, schedules and material lists with quantities showing complete details of all proposed equipment.

1. Spare Parts: Include name, address, and telephone number of in-state supplier of spare parts. No out-of-state suppliers shall be permitted.

C. Maintenance Data: For interior lighting to include in the operation and maintenance manuals specified in Form 818 Article 1.20-1.08-14 subsection 2 and described in NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS.

1.4 QUALITY ASSURANCE:

A. Comply with applicable local code requirements of the authority having jurisdiction and NEC Articles 225, 250, and 410 as applicable to installation, and construction of exterior building lighting fixtures.

B. Comply with requirements of UL standards, including Standards 484A and B, pertaining to exterior lighting fixtures. Provide exterior lighting fixtures and components which are UL-listed and labeled.

C. Comply with ANSI C2, "National Electrical Safety Code."

1.5 SEQUENCING AND SCHEDULING:

A. Coordinate with other work including conductors and cable, raceways and boxes, to properly interface installation of interior lighting fixtures with other work.

1.6 SPARE PARTS:

A. Furnish to the Engineer spare parts described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. 1 LED driver per fixture type

1.7 WARRANTIES:

B. Refer to Form 818 Article 1.20-1.06.08 and NOTICE TO CONTRACTOR – CLOSEOUT DOCUMENTS for additional information.

C. Warranty period: 5 years from the issuance of Certificate of Compliance for LED fixture, factory-installed electrical component system; a minimum of two years for other luminaire components. The warranty shall cover both parts and labor for the complete warranty period.

D. Replace defective and burned out light bars or drivers for a period of one year following the date of Certificate of Compliance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Available Manufacturers: Three for each fixture type, as specified on the lighting fixture schedule, no equals shall be permitted.

2.2 MATERIALS:

A. General:

1. Lighting fixtures (luminaires) shall be complete with mounting brackets and hardware, led modules, drivers, installation accessories, fixture wire, and all accessories as required, as specified in the Fixture Schedule, as shown on the Contract plans and as required by NEC.

1. All LED fixtures shall have the following standard options:
   a. 4000K color temperature
   b. Voltage and phasing as indicated on plans, and panel schedules.
   c. Optics: Full cutoff
   d. 10kV minimum surge suppression
   e. All light fixtures shall qualify for possible utility rebate/incentives.

B. Lighting Fixture Schedule: no equals shall be permitted; contractor shall use the most recent version and or generation of the fixtures below.

NAME	Base DESCRITPION	Min Lumen package	BASIS OF DESIGN 1	BASIS OF DESIGN 2	BASIS OF DESIGN 3
D	LED FULL CUTOFF WALL-PACK LUMINAIRE; BRONZE FINISH, FORWARD THROW	**3,000**	**LITHONIA** WST LED	**RAB** WPLED26N	**Signify** 101L
DS	LED FULL CUTOFF WALL-PACK LUMINAIRE; BRONZE FINISH, WIDE DISTRIBUTION.	**1500**	**LITHONIA** WST LED	**RAB** SLIM	**Signify** 111L Mini
L2	LED COBRA - ROADWAY LUMINAIRE - WIDE ROADWAY DISTRIBUTION. IES TYPE 2M, FULL CUTOFF, MAST ARM, BRONZE FINISH. ADD PHOTOCELL FOR FUEL ISLAND LIGHTING.	**10,400**	**LITHONIA** DSX1	**AEL** ATBO	**Signify** RFM
L3	LED COBRA - ROADWAY LUMINAIRE - FORWARD THROW DISTRIBUTION. IES TYPE III, FULL CUTOFF, MAST ARM, BRONZE FINISH	**11000**	**LITHONIA** DSX1	**AEL** ATBO	**Signify** RFM
L4	LED COBRA - ROADWAY LUMINAIRE – TYPE 4M, FULL CUTOFF, MAST ARM, BRONZE FINISH	**11,000**	**LITHONIA** DSX1	**AEL** ATBO	**Signify** RFM
L5	POST-TOP LED AREA LUNIMAIRE – TYPE 5, FULL CUTOFF, BRONZE FINISH	**8,900**	**LITHONIA** RADPT	**RAB** ALED5S	**Signify** MPTC
GI	FLAG POLE FIXTURE; COMPACT FLOOD, LED, 208V, WIDE FLOOD RECTANGULAR. STANCHION MOUNT, BRONZE FINISH. INCLUDE 24" BRONZE FINISH STANCHION	**15000**	**LITHONIA** DSXF3 LED	**RAB** FXLED	**Signify** FL150
	SALT SHED				
SA	LED WET LOCATION, CORROSION RESISTANT LUMINAIRE, MARINE TYPE, PENDANT MTD., WITH SAFETY CHAIN ASSEMBLY & 3' CORD, PRISMATIC GLASS CLOSED BOTTOM.	**18000**	**HOLOPHANE** PXHW	**RAB** FALCOR230W	**KENALL** EPLB22
SB	LED FULL CUTOFF WALL-PACK LUMINAIRE WITH DIE-CAST ALUMINUM HOUSING PAINTED WITH POWDER COAT FINISH AND IP65 RATING. FORWARD THROW DISTRIBUTION	**8000**	**LITHONIA** WDGE3	**RAB** WPLED	**Signify** 101L
FL	HEAVY DUTY FLOOD LIGHT LUMINAIRE, LED WET LOCATION, MEDIUM FLOOD, BRONZE FINISH, & FIXTURE BRACKET	**17000**	**LITHONIA** DSXF3	**RAB** FXLED	**Signify** FL150

C. Conduits: Conduit, including hangers and fittings, shall be installed where shown on the Contract plans and shall be in accordance with CSI Division 26 Section 260533, "Raceways & Boxes for Electrical Systems."

D. Refractors and Reflectors: All glassware and plastic shall be uniform, free from defects and photometrically tested for distribution by an independent testing laboratory. Plastic

diffusers shall be of new virgin-acrylic plastic material. Designer reserves the right to review photometric test.

2.3 FINISH:

A. Metal Parts: Manufacturer's standard finish except as otherwise indicated. Finish applied over corrosion-resistant primer, free of streaks, runs, holidays, stains, blisters, and similar defects. Remove fixtures and accessories showing evidence of corrosion or finish failure during Project warranty period and replace with new items.

B. Other Parts: Manufacturer's standard finish except as otherwise indicated applied to factory-assembled and -tested luminaire before shipping. Match finish process and color of pole or support materials.

PART 3 - EXECUTION

3.1 EXAMINATION:

A. Examine areas and conditions under which lighting fixtures are to be installed, and substrate for supporting lighting fixtures. Notify Engineer in writing of conditions detrimental to proper completion of the work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer and with approval of Engineer.

3.2 INSTALLATION:

A. Install all luminaires, lamps and associated supports, fittings, conduit, boxes, wiring and grounding conductors as called for in this section, as shown on the plans, as required and in accordance with the manufacturer's instructions and recommendations.

B. Prior to the issuance of the Certificate of Compliance, thoroughly clean the luminaires, LED lens assemblies.

C. All fixtures shall be aligned and directed as shown or so as to illuminate the desired area properly. Fixtures shall be directly and rigidly mounted on their supporting structures using bolted connections. The conduit system shall not be used to support fixtures unless called for.

D. Fixtures shall be mounted plumb, level and in straight lines. Rows of fixtures shall be installed accurately as to line and level. Fastenings and supports shall be firmly set so that the fixtures will not be distorted by handling incident to normal maintenance. All parts including lamps shall be secured to prevent falling or dislocation.

E. Lighting fixtures shall be positioned to clear all obstructions.

F. All auxiliary steel, supports and brackets of all kinds for safety erecting the fixtures shall be furnished and installed in place by the Installer.

G. Where coordination with other equipment is necessary some departure from the locations shown may be permitted on approval of Engineer.

H. All lighting units when installed shall be set true and shall be free of leaks, warps, dents or other imperfections.

I. All lighting fixtures shall be directly grounded to the equipment grounding system by means of a conductor of size not less than that required by NEC. If insulated, the ground conductor insulation shall be colored green.

J. Taps and splices shall be made with insulated wire nut connectors of the setscrew or spring type or with indent compression type connectors. Solid wire shall be terminated at screw type connections by looping around the terminal screw. At panelboards, solid wire may be terminated using screw type pressure terminals; stranded wire may be terminated using saddle type pressure terminals.

K. All fixtures shall be installed for seismic requirements.

3.3 GROUNDING:

A. Provide equipment grounding connections for interior lighting fixtures as indicated under CSI Division 26 Section 260526, "Grounding and Bonding for Electrical Systems."

3.4 FIELD QUALITY CONTROL:

A. The Installer is not responsible for the foot candles of illumination provided by the completed systems. However, if after the lighting is installed and in operation, any areas are noted which are obviously under or overlit, the Installer shall promptly advise the Engineer.

B. Fixtures shall be protected and maintained in good condition during construction. At the completion of the work, all fixtures shall be cleaned, inspected, and repaired, or replaced if damaged, and a complete set of new incandescent lamps shall be installed.

3.5 ADJUSTING AND CLEANING:

A. Clean lighting fixtures of dirt and construction debris upon completion of installation. Clean finger-prints and smudges from lenses.

B. Protect installed fixtures from damage during remainder of construction period.

C. Adjust aim-able fixtures to provide required light intensities.

END OF SECTION 265619