



DESIGN & CONSTRUCTION GROUP
THE GOVERNOR NELSON A. ROCKEFELLER
EMPIRE STATE PLAZA
ALBANY, NY 12242

ADDENDUM NO. 3 TO PROJECT NO. M3215

**HVAC AND ELECTRICAL WORK
REFURBISH BOILER PLANT & REPLACE FEEDWATER SYSTEM
WALLKILL CORRECTIONAL FACILITY
50 MCKENDRICK RD
WALLKILL, NY**

October 2, 2026

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.
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HVAC SPECIFICATIONS

1. SECTION 230926 COMBUSTION CONTROL AND INSTRUMENTATION, Paragraph 1.3.A.6: Replace "Provide variable-speed combustion blower control including variable-speed motor controller (VSD) and replacement TEFC blower motor sized for the burner" with "Provide variable-speed combustion blower control including variable-speed motor controller (VSD) and replacement TEFC blower motor sized as follows."
 - a. Boiler No. 1: 5 hp.
 - b. Boiler No. 2: 10 hp
 - c. Boiler No. 3: 10 hp"
2. SECTION 230926 COMBUSTION CONTROL AND INSTRUMENTATION, paragraph 2.2 M.4: Replace "Not less than 10 gauge furniture steel" with "Not less than 14-gauge steel."
3. SECTION 230926 COMBUSTION CONTROL AND INSTRUMENTATION, paragraph 2.13.B.1.a, Water Column Assemblies: Replace: "Quantity: Two per boiler." with "Quantity: One water column assembly per boiler, three total."
4. SECTION 230926 COMBUSTION CONTROL AND INSTRUMENTATION, paragraph 2.13.B, Gauge Glass: ADD: "Quantity: One gauge glass per boiler, three total. Furnish water column assemblies, gauge glasses, auxiliary low-water cutoffs, probes, isolation valves, blowdown and drain valves, and associated external trim for Boilers 1, 2, and 3. Existing water-column, gauge-glass, and low-water-cutoff assemblies shall not be reused."
5. SECTION 230926 COMBUSTION CONTROL AND INSTRUMENTATION, paragraph 2.13.C, Low Water and High Water Cutoffs: ADD the following: "Provide one auxiliary low-water cutoff for each boiler, separate from and independent of the water column/probe assembly. The

auxiliary low-water cutoff does not constitute a second water column assembly. Water-level device assignments shall be as follows:

Boiler 1:

Water column low-water probe device: LWC-101

Low-water level switch: LSL-101

Auxiliary low-water cutoff: LSL-105

Boiler 2:

Water column low-water probe device: LWC-102

Low-water level switch: LSL-102

Auxiliary low-water cutoff: LSL-106

Boiler 3:

Water column low-water probe device: LWC-103

Low-water level switch: LSL-103

Auxiliary low-water cutoff: LSL-107

Low-water devices shall be independent and shall be connected to the boiler control and flame safeguard systems in accordance with Section 230926 and the control drawings."

6. SECTION 235233 WATER-TUBE BOILER REFURBISHMENT, paragraph 3.8.E: Delete the words "for the replacement burner" and replace with "for the existing burner being refurbished".
7. SECTION 235233 WATER-TUBE BOILER REFURBISHMENT, Article 3.12: Change the Article title from "BLOWER AND FAN REASSEMBLY" to "BURNER REFURBISHMENT AND BLOWER/FAN REASSEMBLY".
8. SECTION 235233 WATER-TUBE BOILER REFURBISHMENT, Add the following Paragraphs after Paragraph 3.12.B:
 - "C. Complete Burner Gun Replacement. As part of burner refurbishment, remove and replace the complete fuel oil burner gun assemblies serving Boilers 1, 2, and 3. Include replacement of the atomizing nozzles/tips and all gun bodies, barrels, internal fuel and atomizing-media tubes, fittings, couplings, gaskets, seals, and attachment hardware forming the manufacturer's complete gun assembly. Nozzle/tip replacement alone, refurbishment of existing guns, or reuse of existing gun components will not be accepted in lieu of complete gun replacement. Retain the existing burners except for the gun assemblies and other components separately specified for replacement. Replacement of the entire burner assemblies is not required.
 - D. Replacement Assemblies. Provide complete original equipment manufacturer replacement gun assemblies, or approved equivalents, compatible with the existing Coen Fyr-Compak burners, No. 2 fuel oil, and the atomizing media used by each burner. Used or reconditioned gun assemblies will not be accepted. Select assemblies to meet the burner manufacturer's requirements for firing capacity, spray characteristics, insertion length, mounting arrangement, and fuel and atomizing-media operating pressures throughout the specified firing range. Include adapters and connection components necessary to connect the replacement gun assemblies to the fuel oil and atomizing-media systems provided under the Contract.
 - E. Verification and Submittals. Field verify existing burner identification, gun configuration, mounting dimensions, connection locations, and operating requirements before ordering replacement assemblies. Submit manufacturer's product data, assembly drawings, model and part numbers, firing-range data, fuel and atomizing-media pressure requirements, and documentation demonstrating compatibility with each existing burner. Identify the proposed assembly for each boiler and submit for approval before procurement.

- F. Removal and Installation. Remove the existing burner gun assemblies in their entirety. Inspect the retained burner mounting interfaces and supports. Report defects affecting installation, alignment, or safe operation to the Director's Representative and obtain written direction before proceeding with corrective work beyond the specified scope. Install the replacement gun assemblies in accordance with the manufacturer's instructions. Provide mounting hardware, gaskets, seals, adapters, and connections necessary for installation. Establish the manufacturer's specified gun insertion depth and nozzle/tip position relative to the burner throat. Maintain access and clearance for withdrawal and servicing of each gun assembly. Coordinate installation with burner refurbishment and replacement of the fuel trains, atomizing-media stations, and combustion controls.
- G. Testing and Adjustment. Leak test the installed gun assemblies and associated connections in accordance with the manufacturer's instructions before firing. Verify gun mounting, insertion depth, nozzle/tip alignment, and fuel and atomizing-media operating pressures. Coordinate startup with the burner and combustion controls contractor. Perform combustion tuning and performance verification in accordance with Section 230926 and Article 3.14 of this Section. Demonstrate stable ignition and combustion throughout the tested firing range without fuel leakage or flame impingement. Record the installed gun and nozzle/tip identification and final operating settings in the commissioning report and operation and maintenance data. Requirements for replacement of fuel trains, atomizing-media stations, controls, fan motors, and other separately specified components remain unchanged.”
9. SECTION 232500 HVAC Water Treatment, Paragraphs 2.2.A: Revise the paragraph to the following: “Existing chemical treatment service provider: Northeast Environmental Water Technologies LLC, Email: Matt@Go2newt.com, Phone: 413-478-7501.”
10. SECTION 235316 DEAERATORS, paragraph 2.5 D.1: Replace “NEMA 250, Type 12” with “UL 508A labeled, NEMA 12, segregated power/control wiring, LED lighting, and GFCI outlet.”

ELECTRICAL SPECIFICATIONS

11. SECTION 260543 UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS: Revise paragraph 3.4 A to read as:
- “A. Reference Specification Section 310000 – Earthwork and Section and 310001 – Earthwork materials for information.”
12. SECTION 260543 UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS: Remove paragraphs 3.4 B and 3.4 C in their entirety.
13. SECTION 260543 UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS: Revise paragraph 3.5 M., 1 to read as:
- “1. Excavate trench bottom to provide firm and uniform support for duct.”
14. SECTION 260533 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS: Discard the Section bound in the Project Manual and substitute with the accompanying Section (pages 260533 – 1 thru 260533 – 15) noted “Addendum 3.”

15. SECTION 262313 PARALLELING LOW-VOLTAGE SWITCHGEAR: Discard the Section bound in the Project Manual and substitute with the accompanying Section (pages 262313 – 1 thru 262313 – 17) noted “Addendum 3.”
16. SECTION 263213.16 DIESEL-ENGINE-DRIVEN GENERATOR SETS: Revise paragraph 2.11, A, 10 to read as:

“10. Kirk Key Interlocks, access door is kirk keyed with Automatic Transfer Switch, and Paralleling Low Voltage Switchgear.”
17. SECTION 263213.16 DIESEL-ENGINE-DRIVEN GENERATOR SETS: Add paragraph 2.1, A, 4 to read as:

“4. MTU Energy Solutions “
18. SECTION 310000 EARTHWORK: Add the attached accompanying Section (pages 310000 -1 thru 310000 – 8) to the Project Manual.
19. SECTION 310001 EARTHWORK MATERIALS: Add the attached accompanying Section (pages 310000 -1 thru 310000 – 3) to the Project Manual.

HVAC DRAWINGS

20. Drawing No. M-502:
 - a. DETAILS, Detail 2, Typical Boiler Front View Installation, ADD the following note:
"TYPICAL EACH BOILER: PROVIDE ONE REPLACEMENT WATER COLUMN WITH PROBES, ONE REPLACEMENT WATER LEVEL GAUGE GLASS, AND ONE REPLACEMENT, SEPARATE AUXILIARY LOW-WATER CUTOFF. CONNECT AT THE EXISTING BOILER WATER-LEVEL CONNECTION POINTS. FIELD VERIFY CONNECTION LOCATIONS AND ELEVATIONS. PROVIDE ISOLATION VALVES, BLOWDOWN AND DRAIN VALVES, FITTINGS, PIPING, AND TRIM FOR THE COMPLETE INSTALLATION."
21. Drawing No. M-502:
 - a. DETAILS, Identify the water-level devices on Detail 2/M-502 in accordance with the following:

“Boiler 1: LWC-101, LSL-101, and LSL-105.
Boiler 2: LWC-102, LSL-102, and LSL-106.
Boiler 3: LWC-103, LSL-103, and LSL-107.”
22. Drawing No. M-601:
 - a. FUEL OIL TANK STORAGE SCHEDULE, column CAPACITY (GAL): Replace “2,000” WITH “3,000”.
23. Drawing No. M-703:
 - a. BOILER PLANT CONTROL SYSTEM DIAGRAM, Revise the auxiliary low-water cutoff tags to agree with Drawing M-702 as follows:

“ Boiler 1: Change LSL-104 to LSL-105.
Boiler 2: Change LSL-105 to LSL-106.
Boiler 3: Change LSL-106 to LSL-107.”

ELECTRICAL DRAWINGS

24. Revised Drawings:
 - a. Drawing Nos. E-001, E-301, E-302, E-401, E-402, E-403, and E-501, noted Bid Addendum 3, dated 9/26/26, accompanies this Addendum and supersedes the same numbered previously issued drawings.
25. Drawing No. ES-101:
 - a. Revise “KEYED REMOVAL NOTES, THIS SHEET” to read as “KEYED NOTES, THIS SHEET.”
26. Drawing No. ES-101:
 - a. Partial Site Plan, Detail 2/ES-101: Revise title to read as “PARTIAL ENLARGED SITE PLAN.”
27. Drawing No. ES-101:
 - a. Partial Site Plan, Detail 2/ES-101: Revise plan note at two (2) packaged modular generators from “PROVIDE PACKAGED MODULAR, STAND-BY GENERATOR WITH INTEGRAL LEVEL 2 SOUND ATTENUATED ENCLOSURE, AND INTEGRAL DAY TANK ON 6 INCH HOUSE KEEPING PAD. SEE ONE-LINE DIAGRAM -POWER INSTALLATIONS FOR INFORMATION. BASIS OF DESIGN; GENERAC POWER SYSTEMS MD300, 300kW, 375kVA 480V, 3 PHASE WITH MAIN LINE OUTPUT BREAKER AND EXHAUST SYSTEM.” to read as “PROVIDE PACKAGED MODULAR STAND-BY GENERATOR WITH INTEGRAL LEVEL 2 SOUND ATTENUATED ENCLOSURE AND PARAELLING LOW-VOLTAGE SWITCHGEAR AND APPURTENANCES. SEE ONE-LINE DIAGRAMS AND SPECIFICATIONS 263213.13 AND 262313 FOR INFOMATION.”
28. Drawing ES-101:
 - a. Partial Site Plan, Detail 1/ES-101, detail section callout symbol, Revise section callout from “5/ES-101” to read as; “5/E-402”.

END OF ADDENDUM

Brady M. Sherlock, P.E.
Director, Division of Design
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SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal conduits and fittings.
 - 2. Nonmetallic conduits and fittings.
 - 3. Metal wireways and auxiliary gutters.
 - 4. Boxes, enclosures, and cabinets.
 - 5. Handholes and boxes for exterior underground cabling.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.

1.4 SUBMITTALS

- A. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
- B. Manufacturer's installation instructions shall be provided along with product data.
- C. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
- D. Product Data: For wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- E. Submit an Environmental Product Declaration (EPD) from the manufacturer for steel conduit within this specification section, if available. A statement of the contractor's good faith effort to obtain the EPD shall be provided if not available.
 - 1. Manufacturer-provided EPDs must be Product Specific Type III (Third-Party Reviewed), in adherence with ISO 14025 *Environmental labels and declarations*, ISO 14044 *Environmental management – Life cycle assessment*, and ISO 21930 *Core rules for environmental product declarations of construction products and services*.
- F. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Allied Tube & Conduit Corp.
 - b. Western Tube & Conduit Corp.
 - c. Wheatland Tube Co.
 - d. Or equal.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
 - a. Comply with NEMA RN 1.
 - b. Coating Thickness: 0.040 inch (1 mm), minimum.
5. EMT: Comply with ANSI C80.3 and UL 797.
6. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.

B. Metal Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cooper/Crouse-Hinds.
 - b. OZGedney Co.
 - c. Thomas & Betts Corp.
 - d. Or equal.
2. Comply with NEMA FB 1 and UL 514B.
3. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
4. Fittings, General: Listed and labeled for type of conduit, location, and use.
5. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
6. Fittings for EMT:
 - a. Material: die cast.
 - b. Type: compression.
7. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

8. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
- C. Joint Compound for GRC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Nonmetallic Conduit:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cantex, Inc.
 - b. Carlon.
 - c. National Pipe & Plastic Inc.
 - d. Or equal.
2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fiberglass:
 - a. Comply with NEMA TC 14.
 - b. Comply with UL 2515 for aboveground raceways.
 - c. Comply with UL 2420 for belowground raceways.
4. ENT: Comply with NEMA TC 13 and UL 1653.
5. RNC: Type EPC-80-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
6. LFNC: Comply with UL 1660.
7. Rigid HDPE: Comply with UL 651A.
8. Continuous HDPE: Comply with UL 651A.
9. Coilable HDPE: Preassembled with conductors or cables and complying with ASTM D3485.
10. RTRC: Comply with UL 2515A and NEMA TC 14.

B. Nonmetallic Fittings:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Cantex, Inc.
 - b. Carlon.
 - c. National Pipe & Plastic Inc.
 - d. Or equal.
2. Fittings, General: Listed and labeled for type of conduit, location, and use.

3. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - a. Fittings for LFNC: Comply with UL 514B.
4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. Mono-Systems Inc.
 2. Thomas & Betts Corp.
 3. Wiremold Co.
 4. Or equal.
- B. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 3R, Type 12 unless otherwise indicated, and sized according to NFPA 70.
 1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type, Flanged-and-gasketed type unless otherwise indicated.
- E. Finish: Manufacturer's standard enamel finish.

2.4 BOXES, ENCLOSURES, AND CABINETS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 1. Appleton - O-Z/Gedney; Emerson Electric Co., Automation Solutions.
 2. Eaton (Crouse-Hinds).
 3. Hubbell Incorporated.
 4. Or equal.
- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

- E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lbs. Outlet boxes designed for attachment of luminaires weighing more than 50 lbs shall be listed and marked for the maximum allowable weight.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, galvanized, cast iron with gasketed cover.
- H. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- I. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- J. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 3R with continuous-hinge cover with flush latch unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Fiberglass.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- K. Cabinets:
 - 1. NEMA 250, Type 3R galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.
 - 3. Key latch to match panelboards.
 - 4. Metal barriers to separate wiring of different systems and voltage.
 - 5. Accessory feet where required for freestanding equipment.
 - 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- L. CORROSION RESISTANT BOXES
 - 1. Plastic Coated Outlet and Junction Boxes: Threaded type malleable iron boxes coated with 40 mils thick polyvinylchloride coating.
 - 2. Non-Metallic Junction and Pull boxes: Glass fiber reinforced polyester.

2.5 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

- A. General Requirements for Handholes and Boxes:
 - 1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
 - 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
 - a. Armorcast Products Company.
 - b. Oldcastle Enclosure Solutions.
 - c. Quazite; Hubbell Incorporated, Power Systems.
 - d. Or equal.
2. Standard: Comply with SCTE 77.
3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
6. Cover Legend: Molded lettering, "ELECTRIC".
7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
8. Handholes 12 Inches Wide by 24 Inches Long and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.6 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

1. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
2. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

2.7 NAMEPLATES AND TAGS

- A. General: Precision engraved letters and numbers with uniform margins, character size minimum 3/16 inch high.
 1. Phenolic: Two color laminated engraver's stock, 1/16-inch minimum thickness, machine engraved to expose inner core color (white).
 2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.
 3. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
 1. Exposed Conduit: GRC, PVC COATED GRC.
 2. Concealed Conduit, Aboveground: GRC, EMT

3. Underground Conduit: RNC, Type EPC-80-PVC, direct buried, concrete encased.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFNC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
 - a. Electrical rooms
 - b. Mechanical rooms.
4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250.

C. Minimum Raceway Size: 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use compression, cast-metal fittings. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

F. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
- C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.

- D. Do not fasten conduits onto the bottom side of a metal deck roof.
- E. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- F. Complete raceway installation before starting conductor installation.
- G. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- H. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- I. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- J. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- K. Support conduit within 12 inches of enclosures to which attached.
- L. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Director's Representative for each specific location.
- M. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- N. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- O. Coat field-cut threads on PVC-coated raceway with a corrosion-preventing conductive compound prior to assembly.
- P. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- Q. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal

bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.

- R. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- S. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.
- T. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- U. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
 - 1.
- V. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- W. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.
 - 3. Conduit extending from interior to exterior of building.
 - 4. Conduit extending into pressurized duct and equipment.
 - 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 - 6. Where otherwise required by NFPA 70.
- X. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- Y. Expansion-Joint Fittings:
 - 1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
 - 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
 - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
 - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- Z. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semi-recessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- AA. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to top of box unless otherwise indicated.
- BB. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- CC. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- DD. Locate boxes so that cover or plate will not span different building finishes.
- EE. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- FF. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- GG. Set metal floor boxes level and flush with finished floor surface.
- HH. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings.
1. Each raceway shall enclose one circuit unless otherwise indicated on the drawings.
- II. Number of Raceways: Do not change number of raceways to less than the number indicated on the drawings except when appropriate for advantageous reuse of existing exposed and concealed raceways (The contract documents do not indicate location, number, size or condition of existing raceways). Existing raceways may be reused if the following conditions are met:
1. The existing raceway must be of adequate size for the new conductors to be installed therein (NFPA 70 Chapter 9, Tables 1, 4, & 5; Appendix C, Tables C1-C12a). More circuits may be enclosed by existing raceways than the circuiting shown on the drawings

provided conductor sizes are increased to compensate for derating (adjustment factors) and other considerations required by NFPA 70 Article 310-15.

2. Remove existing conductors.
3. Demonstrate to the Director's Representative that the existing raceway is clear of obstructions and in good condition.
4. Check ground continuity. When ground continuity of existing raceway is inadequate install insulated grounding bushings, grounding wedges, bonding straps, grounding jumpers or equipment grounding conductors to establish effective path to ground.
5. Install insulated bushings to replace damaged or missing bushings. Replace non-insulated bushings with insulated bushings on raceway sizes 1 inch and larger.
6. Install vertical conductor supports to replace existing or missing vertical conductor supports.
7. Install extension rings on existing boxes when the number of new conductors installed therein exceeds NFPA 70 requirements.
8. Furnish the Director's Representative with marked up drawings showing size and routing of existing raceways with number and size of new conductors installed therein. The drawings will be forwarded to the design Director's Representative for verification of NFPA 70 compliance.
9. Furnish the Director's Representative with marked up drawings showing size and routing of existing raceways with number and size of new conductors installed therein. The drawings will be forwarded to the design Director's Representative engineer for verification of NFPA 70 compliance.

JJ. Raceway Schedule:

1. Rigid Ferrous Metal Conduit: Install in all locations unless otherwise specified or indicated on the drawings.
2. Intermediate Ferrous Metal Conduit: May be installed in all dry and damp locations except:
 - a. Hazardous areas.
 - b. Where other type raceways are specified or indicated on the drawings.
3. Electrical Metallic Tubing:
 - a. May be installed concealed as branch circuit conduits above suspended ceilings where conduit does not support fixtures or other equipment.
 - b. May be installed concealed as branch circuit conduits in hollow areas in dry locations, including:
 - 1) Hollow concrete masonry units, except where cores are to be filled.
 - 2) Drywall construction with sheet metal studs, except where studs are less than 3-1/2 inches deep.
 - c. May be installed exposed as branch circuit conduits in dry non-hazardous locations at elevations over 10'-0" above finished floor where conduit does not support fixtures or other equipment.

4. Flexible Metal Conduit: Install equipment grounding conductor in the flexible metal conduit and bond at each box or equipment to which conduit is connected:
 - a. Use for final conduit connection to recessed lighting fixtures in suspended ceilings. Use 4 to 6 feet of flexible metal conduit (minimum size 1/2 inch) between junction box and fixture. Locate junction box at least 1 foot from fixture and accessible if the fixture is removed.
 - b. Use 1 to 3 feet of flexible metal conduit for final conduit connection to:
 - 1) Emergency lighting units.
5. Liquid-tight Flexible Metal Conduit: Install equipment grounding conductor in liquid-tight flexible metal conduit and bond at each box or equipment to which conduit is connected:
 - a. Use 1 to 3 feet of liquid-tight flexible metal conduit (UL listed and marked suitable for the installation's temperature and environmental conditions) for final conduit connection to:
 - 1) Motors with weather-protected or totally enclosed housings.
 - 2) Equipment subject to vibration (damp and wet locations).
 - 3) Equipment requiring flexible connection for adjustment or alignment (damp and wet locations).
6. Surface Metal Raceway: Use as exposed raceway system in finished spaces at locations indicated on the drawings.
 - a. Use surface metal raceway system of size required for number of wires to be installed therein. (Use specific size when indicated on the drawings).
 - b. Do not run raceway through walls that have a plaster finish nor through masonry walls or floors. Install a pipe sleeve, or a short length of conduit with junction boxes or adapter fittings for raceway runs through such areas. Run raceway along top of baseboards, care being taken to avoid telephone and other signal wiring. Where raceway crosses chair railing or picture molding, cut the chair railing or picture molding to permit the raceway to lie flat against the wall. Run raceway around door frames and other openings. Run raceway on ceiling or walls perpendicular to or parallel with walls and floors.
 - c. Secure raceway at intervals not exceeding 36 inches.
 - d. Install separate equipment grounding conductor for grounding of equipment. The raceway alone will not be considered suitable for use as an effective path to ground.
 - e. Outlet box covers for pendant mounted fluorescent fixtures may be omitted if the fixture canopy is notched to receive the raceway and the canopy fits snugly against the ceiling.
 - f. Where equipment is mounted on an outlet box and the equipment base is larger than the outlet box, provide finishing collar around equipment base and outlet box or provide finishing collar/outlet box:
 - 1) Finishing Collar: Same finish and peripheral dimensions as the equipment base, including provisions for mounting, slots to fit over raceway and of depth to cover outlet box and extend back to ceiling or wall.

- 2) Combination Finishing Collar/Outlet Box: Same finish and peripheral dimensions as the equipment base to be mounted thereon, gage or thickness of metal as required by National Electrical Code, including provision for mounting and knockouts for entrance of raceway.
7. Wireways: May be used indoors in dry locations for exposed raceway between grouped, wall mounted equipment.

KK. Box Schedule for Concealed Conduit System:

1. Non-Fire Rated Construction:
 - a. Depth: To suit job conditions and comply with NFPA 70 Article 370.
 - b. For Lighting Fixtures: Use galvanized steel outlet boxes designed for the purpose.
 - 1) For Fixtures Weighing 50 lbs. or Less: Box marked "FOR FIXTURE SUPPORT".
 - 2) For Fixtures More Than 50 lbs: Box listed and marked with the weight of the fixture to be supported (or support fixture independent of the box).
 - c. For Ceiling Suspended Fans:
 - 1) For Fans Weighing 35 lbs or Less: Marked "Acceptable for Fan Support."
 - d. For Junction and Pull Boxes: Use galvanized steel boxes with flush covers.
 - e. For Switches, Receptacles, Etc:
 - 1) Plaster or Cast-In-Place Concrete Walls: Use 4 inch or 4-11/16-inch galvanized steel boxes with device covers.
 - 2) Walls Other Than Plaster or Cast-In-Place Concrete: Use type of galvanized steel box which will allow wall plate to cover the opening made for the installation of the box.
2. Other Fire Rated Construction: Use materials and methods to comply with the listing requirements for the classified construction. Conduits Penetrating Concrete Floor Slabs (Concrete slabs that are both ceilings and floors shall be treated as floor slabs):
 - a. Provide a minimum of 2 inches between conduits that vertically penetrate elevated concrete slabs.

LL. Conduit Installed Exposed:

1. Install conduit exposed where indicated on the drawings. If not indicated, conduit may be installed exposed, as approved, in:
 - a. Unfinished spaces, and finished spaces housing mechanical or electrical equipment that is generally accessible only to facility maintenance personnel.
 - b. Areas where existing conduits have been installed exposed.
 - c. Areas where conduit cannot be installed concealed.
2. Install conduit tight to the surface of the building construction. Exception:

- a. Where otherwise indicated or directed.
- 3. Install vertical runs perpendicular to the floor.
- 4. Install runs on the ceiling perpendicular or parallel to the walls.
- 5. Install horizontal runs parallel to the floor.
- 6. Do not run conduits near heating pipes.
- 7. Installation of conduit directly on the floor will not be permitted.

MM. Box Schedule for Exposed Conduit System:

- 1. Dry and Damp Locations: Use zinc electroplate or hot dipped galvanized threaded type malleable iron or cast iron alloy outlet, junction, and pull boxes or conduit bodies provided with a volume marking in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - a. Galvanized steel boxes may be used in conjunction with conduit sizes over 1 inch in non-hazardous dry and damp locations.
 - b. Galvanized steel boxes may be used in conjunction with electrical metallic tubing where it is allowed (specified) to be installed exposed as branch circuit conduits at elevations over 10'-0" above finished floor.
- 2. Wet Locations: Use threaded type malleable iron or cast iron alloy outlet junction, and pull boxes or conduit bodies (provided with a volume marking) with hot dipped galvanized or other specified corrosion resistant coating in conjunction with ferrous raceways unless otherwise specified or indicated on the drawings.
 - a. Use corrosion resistant boxes in conjunction with plastic coated rigid ferrous metal conduit.
- 3. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Equipment Used with Exposed Raceway):
 - a. Use finishing collar where surface mounted equipment is installed on an exposed raceway outlet box and the equipment base is larger than the outlet box.
 - b. Use combination finishing collar/outlet box where surface mounted equipment is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into equipment body due to equipment design.

3.3 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.4 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 262313 – PARALLELING LOW-VOLTAGE SWITCHGEAR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. NOTE: Not all generator manufactures require a generator control and paralleling panel in order to parallel two generators. However, if required the following specification and requirements must be adhered.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- C. Related Requirements:
 - 1. Section 263213.13 "Diesel Driven Engine Generator Sets"
 - 2. Section 263600 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine generators. Generator Paralleling Low-Voltage Switchgear

1.2 SUMMARY

- A. Section Includes: metal-enclosed, low-voltage, circuit-breaker switchgear rated 600 V and less, and associated monitoring and control systems for paralleling standby generators on an isolated bus and for distributing electrical power.

1.3 DEFINITIONS

- A. ATS: Acceptance Testing Specification.
- B. DDC: Direct digital control.
- C. Legally Required: As used in this Section, it shall have the same meaning as used in NFPA 70.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of paralleling low-voltage switchgear.
 - 1. Include technical data on features, performance, electrical characteristics, ratings, and finishes for programmable logic controllers, instrumentation, control devices, monitoring devices, Ethernet interface, and display components.
 - 2. Include rated capacities, operating characteristics, furnished specialties, factory settings, and accessories for individual circuit breakers.
 - 3. Include time-current characteristic curves for overcurrent protective devices.

B. Shop Drawings: For each type of paralleling low-voltage switchgear.

1. Include dimensioned plans, elevations, sections, details, shipping sections, weights of each assembled section, and required clearances and service space around equipment.
2. Include tabulation of installed devices with features and ratings.
3. Include enclosure types and details.
4. Detail locations for anchor bolts and leveling channels.
5. Show bus configuration with current rating, size, and number of conductors in each bus run, including phase, neutral, and ground conductors of main and branch buses.
6. Indicate short-time and short-circuit current rating of switchgear assembly.
7. Include features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
8. Detail nameplate legends.
9. Include mimic-bus diagram.
10. Include three-line power wiring diagrams for paralleling low-voltage switchgear, generators, and related equipment showing device terminal numbers.
11. Include point-to-point schematic control, monitoring, and alarm wiring diagrams showing internal component terminal numbers.
12. Include point-to point schematic control, monitoring, and alarm wiring diagrams for external components indicating terminal numbers for the following:
 - a. Engine generators.
 - b. Transfer switches.
 - c. Other load-control devices.
 - d. Elevator controller in each elevator bank.
 - e. DDC system for HVAC controller.
 - f. SCADA remote terminal unit.

C. Samples: Representative portion of mimic bus with specified finish. Manufacturer's color charts showing colors available for mimic bus.

D. Delegated-Design Submittal: For paralleling low-voltage switchgear.

1. Include design calculations, signed and sealed by a qualified professional engineer, for selecting seismic restraints and for structural analysis of outdoor enclosures, including wind loading.

E. Sequence of Operation: Description of sequence of operation for paralleling controls in automatic, manual, system test, and peak-shaving modes.

1. Include the following in the description of the automatic-mode sequence of operation:
 - a. Programmed sequence of initial generator starting and connection of generators to the isolated paralleling bus, including a description of how the proposed design complies with the requirements for redundancy.
 - b. Programmed sequence of transferring loads to the isolated paralleling bus based on operator-adjustable preset priorities and preset loads. Include initial load settings.
 - c. Programmed sequence of starting and stopping generators based on actual real-time measured loads.
 - d. Programmed sequence of sending a load-shed signal to transfer switches, and to other devices when the generator frequency does not return to the normal frequency within the adjustable time period.

- e. Programmed sequence of stopping generators based on no transfer switch or other device sending a start signal.
- 2. Include the following in the description of the system testing mode sequence of operation:
 - a. Load.
 - b. No load.
- 3. Include in the description, the peak-shaving-mode sequence of operation.
- 4. Include in the description, the manual-mode sequence of operation showing that the manual mode fulfills the requirement to permit the operator at the paralleling low-voltage switchgear to accomplish all automatic, system test, and peak-shaving functions.
- 5. Paralleling Low-Voltage Switchgear Redundancy: Identify any single points of failure.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings:
 - 1. Floor plans showing dimensioned layout, required working clearances, and required area above and around paralleling low-voltage switchgear where pipe and ducts are prohibited.
 - 2. Switchgear layout and relationships between components and adjacent structural and mechanical elements.
 - 3. Support locations, type of support, and weight on each support. Indicate field measurements.
- B. Qualification Data: For testing agency.
 - 1. .
- C. Source quality-control reports.
- D. Field quality-control reports.
- E. Sample Warranty: For manufacturer's special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Updated mimic bus diagram reflecting field changes after final switchgear load connections have been made, for record.
- B. Operation and Maintenance Data: For paralleling low-voltage switchgear and components to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for sequence of operation.
 - b. Manufacturer's system checklists, maintenance schedule, and maintenance log sheets complying with NFPA 110.
 - c. Manufacturer's written instructions for testing and adjusting relays.
 - d. Time-current curves, including selectable ranges for each type of overcurrent

protective device.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Control Power Fuses: Six of each type and rating used. Include spares for the following:
 - a. Potential transformers.
 - b. Control power circuits.
 - 2. Indicating Lights: Six of each type installed.

1.8 QUALITY ASSURANCE

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

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Deliver paralleling low-voltage switchgear in sections of lengths that can be moved past obstructions in delivery path.
- B. Store paralleling low-voltage switchgear indoors in clean dry space with uniform temperature to prevent condensation.

1.10 FIELD CONDITIONS

- A. Installation Pathway: Remove and replace building components and structures to provide pathway for moving paralleling low-voltage switchgear into place.
- B. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Director's Representative no fewer than five days in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service Director's Representative written permission.
- C. Environmental Limitations: Rate equipment for continuous operation at indicated ampere ratings for the following conditions:
 - 1. Ambient temperature not exceeding 104 deg F.
 - 2. Altitude of 1000ft. above sea level.

1.11 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace paralleling equipment that fails in materials or workmanship within specified warranty period.

- 1. Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain paralleling gear and auxiliary components from the same manufacture as the generators.

- B. Acceptable Manufactures:

- 1) Generac Industrial Power, Inc.
 - 2) Caterpillar, Inc.
 - 3) Cummins Power Generation.

2.2 SYSTEM DESCRIPTION

- A. 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.

- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for paralleling low-voltage switchgear, including clearances between paralleling switchgear and adjacent surfaces and other items. Comply with indicated maximum dimensions.

- C. The multiple-generator paralleling monitoring and control panel in the paralleling low-voltage switchgear shall monitor and control the following standby power system components:

- 1. Paralleling low-voltage switchgear.
 - 2. Single-generator monitoring and control system.
 - 3. Single-generator paralleling monitoring and control systems that are part of the paralleling Generator Control Panel.
 - 4. Engine generators.
 - 5. Transfer switches.
 - 6. Circuit breakers downstream of transfer switches.
 - 7. Other load-control devices.
 - 8. Distribution circuit breakers in paralleling low-voltage switchgear.

- D. Sequence of Operation for Normal Conditions:

- 1. Paralleling low-voltage switchgear, including controlled generators, controlled circuit breakers, and other controlled devices, and transfer switches, shall be in the automatic position and ready to operate on loss of power or other designated initiation conditions.
 - 2. Each single-generator monitoring and control system has not received a "start" signal from the following:
 - a. Transfer switch.

- b. Multiple-generator paralleling monitoring and control system.
- E. Sequence of Operation for Loss of Normal Power Conditions:
 - 1. Each single-generator monitoring and control system shall receive a start signal from a redundant system.
 - a. Start signal may come from a transfer switch directly wired to start each engine generator.
 - 2. On receiving a start signal, each single-generator monitoring and control system shall start engine generators and achieve rated voltage and frequency.
 - 3. If engine generator fails to start, after expiration of over-crank time delay, engine generator shuts down and alarm is initiated.
 - 4. Each single-generator paralleling monitoring and control system synchronizes its associated engine generator and allows closure of respective generator paralleling low-voltage circuit breakers to the isolated paralleling bus. On closure to isolated paralleling bus, each engine generator assumes its proportional share of total load.
 - 5. Failure of an Engine Generator to Synchronize: If engine generator fails to synchronize, sound an alarm after a preset time delay, but continue to attempt to synchronize the engine generator until signaled to stop by manual operation.
- F. Comply with NFPA 110 for the following:
 - 1. Emergency: EPSS Level 1, Type 10.
 - 2. Legally Required Standby: EPSS Level 1, Type 60.
 - 3. Optional Standby: EPSS Level 1.
- G. Comply with NFPA 99 for healthcare applications.

2.3 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Paralleling low-voltage switchgear outdoor enclosures shall comply with locally adopted codes for gravity and wind loads.
- B. Note if an enclosure (other than the generator enclosure) is required for the paralleling switching and controls is required, it shall be located on the generator pad and shall be NEMA 3R rated.

2.4 SINGLE-GENERATOR PARALLELING MONITORING AND CONTROL SYSTEM

- A. Source Limitations: Obtain paralleling low-voltage switchgear from same manufacturer as required for transfer switches and engine generators.
- B. Components and Devices: Factory mount in each single-generator section of the metal-enclosed, paralleling low-voltage switchgear.
 - 1. Paralleling low-voltage switchgear door-mounted control devices shall be industrial oil-type devices. Indicator lamps shall be high-intensity digital display.
- C. Control Power: Supply control power from the 24-V dc starting batteries from the controlled generator. Include separate control power battery system rated 24-V dc for any equipment unable

to accept the voltage drop that occurs during engine cranking.

D. Single-Generator Paralleling Low-Voltage Switchgear Circuit Breaker:

1. Factory mount the circuit-breaker control switch.
2. Paralleling Circuit-Breaker Monitor and Control:
 - a. Monitors circuit-breaker auxiliary contacts.
 - b. Initiates fault signal if circuit breaker fails to close within adjustable time-delay period (0.5 to 15 seconds).
 - c. Trips open and locks out paralleling circuit breaker on paralleling circuit breaker failure to close, until manually reset.

E. Generator Mode Selector Switch: Factory mounted in the single-generator paralleling monitoring and control system module of the metal-enclosed, paralleling low-voltage switchgear.

1. "Lockout/Reset" mode prevents generator from starting or immediately shuts down generator if running.
2. "Off/Cool-Down" mode stops engine after a cool-down period.
3. "Auto" mode allows generator to start on receipt of remote start signal. If the generator is already running and there is not a start signal, then "Auto" mode allows engine to run for predetermined cool-down period before stopping.
4. "Test Off-Line" allows engine to start and run as if a start signal were received, except it does not allow generator to connect to the isolated paralleling bus unless a start signal is received.
5. "Test Online" allows the engine to start, run, and connect to the isolated paralleling bus as if a start signal were received.

F. Engine Generator Controller: Woodward compatible.

1. Factory mount governor (speed control and load sharing) supplied in applicable engine generator Section in single-generator monitoring and control module.
2. Loading control interface to the governor system.
3. Automatic synchronizer.

G. Automatic Synchronizer:

1. Include sync mode selector switch with RUN-OFF-CHECK-PERMISSIVE positions. In RUN mode, enable active synchronization and sync-check function. In CHECK mode, perform the sync-check function. In PERMISSIVE mode, annunciate when generator and bus are synchronized but do not allow breaker closure.
 - a. Include discrete inputs in synchronizer to switch to each mode.
2. Bias the generator speed and voltage to match the paralleling isolated bus.
3. If the automatic synchronizer receives a permissive signal to allow closure to the paralleling isolated bus and the generator is within synchronizing limits, send a close signal to the single-generator paralleling circuit breaker.

H. Sync-switch, removable, keyed T-handle.

I. "Engine Generator Synchronized" Indication: Indicator lamp or digital-display indication of synchronization.

- J. Voltage and Frequency Raise and Lower Switches: Allow plus or minus 5 percent adjustment when engine generator is operating but is not connected to the isolated paralleling bus.
- K. Control and Reset Push Button: Have flashing lamp to indicate generator is locked out due to fault condition.
- L. Lamp Test Push Button: Simultaneously tests all lamps on panel.
- M. Control Panel Illumination: DC lamps illuminate panel when lighting from surrounding environment is unavailable.
- N. Emergency Stop Push Button: Red mushroom-head switch maintains its position until manually reset.
- O. Connection to Metis BMS System:
 - 1. A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication.
 - 2. Provide connections for datalink transmission of indications to remote data terminals via ModBus and Ethernet SNMP.
- P. Alarm and Status Indicating Display:
 - 1. Status and Alarm Indications:
 - a. Status, Light Only (Non-latching):
 - 1) Generator mode selector switch not in auto (red).
 - 2) Generator mode selector switch in auto (green).
 - 3) Start signal received (green).
 - 4) Emergency stop activated (red).
 - 5) Demand mode standby (green).
 - 6) Timing for start (green).
 - 7) Timing for shutdown (green).
 - 8) Generator circuit breaker closed (red).
 - 9) Generator circuit breaker open (green).
 - a) Generator circuit breaker locked out (white).
 - b) Generator circuit breaker racked out (white)
 - 10) Remote generator breaker is open (red).
 - 11) Engine stopped (green).
 - 12) Time-delay start (green).
 - 13) Engine running (red).
 - 14) Engine cool-down (green).
 - b. Pre-Alarm, Light and Horn (Non-latching):
 - 1) Pre-high coolant temperature (amber).
 - 2) Pre-low oil pressure (amber).
 - 3) Low coolant temperature (amber).
 - 4) Engine low battery (amber).
 - 5) Battery charger failure (amber).
 - 6) Auxiliary power failure (amber).
 - 7) Low fuel-day tank (amber).
 - 8) Paralleling low-voltage switchgear generator breaker failed to close (amber).
 - 9) Paralleling low-voltage switchgear generator breaker failed to open (amber).

- 10) Overcurrent alarm (amber).
- 11) Day tank low-fuel alarm (amber).
- 12) Ground-fault alarm (amber).
- c. Shutdown Alarm, Light and Horn (Latching):
 - 1) Engine overcrank (red).
 - 2) Engine overspeed (red).
 - 3) Engine low oil pressure (red).
 - 4) Engine high coolant temperature (red).
 - 5) Engine low coolant level (red).
 - 6) Engine remote emergency shutdown (red).
- d. Generator fail to synchronize shutdown (red).
 - 1) Generator circuit breaker tripped (red).
 - 2) Generator circuit breaker failure (red).
 - 3) Generator not in auto (red).
 - 4) Generator loss of field (red).
 - 5) Generator reverse power (red).
 - 6) Generator undervoltage (red).
 - 7) Generator overvoltage (red).
 - 8) Generator underfrequency (red).
 - 9) Generator over-frequency (red).
 - 10) Phase rotation (red).
 - 11) Generator short circuit (red).
 - 12) Day tank low-fuel shutdown (red).
 - 13) Air damper activated, shutdown (red).

Q. Paralleling Controls and Protection:

- 1. Engine Generator Governor (Speed Control and Load Sharing): Comply with requirements in applicable engine generator Section. Components shall be Woodward compatible.
- 2. Kilowatt Load Sharing Control and Interface:
 - a. Operates engine generator governors during synchronizing and provides isochronous load sharing when paralleled.
 - b. Allows engine generator to ramp up to kilowatt load level.
- 3. Paralleling Monitor and Control:
 - a. Monitors and verifies that engine generator has reached 90 percent of nominal voltage and frequency before closing to the isolated paralleling bus.
 - b. Prevents accidental closure of the breaker with the engine generator out of phase with the bus.
 - c. Prevents out-of-phase closure to the isolated paralleling bus due to errant manual or automatic operation of synchronizer.
 - d. System of diagnostic digital displays to assist in analyzing synchronization.
- 4. Synchronizer Control:
 - a. Adjusts engine governor to match voltage, frequency, and phase angle of the isolated paralleling bus.
 - b. Maintains engine generator voltage within 1 percent of the isolated paralleling bus voltage, and phase angle within 20 electrical degrees of the isolated paralleling bus

- c. Provides "fail-to-synchronize time delay" adjustable from 10 to 120 seconds; with field selectivity to either initiate alarm or shut down engine generator on failure condition.
 - d. Reverse Power Monitor and Control: Prevents sustained reverse power flow in engine generator.
 - e. Trips generator paralleling circuit breaker and initiates engine generator shutdown when reverse power condition exceeds 10 percent of engine generator kilowatt for three seconds.
 - f. Trips generator paralleling circuit breaker and initiates engine generator shutdown when reverse kilovolt-ampere conditions exceeds 20 percent of generator kilovolt-ampere rating.
- 5. Phase Rotation Monitor and Control: Verifies engine generator and isolated paralleling bus phase rotation match prior to closing paralleling circuit breaker.
- 6. Electronic Alternator Overcurrent Alarm and Shutdown Control:
 - a. Monitors current flow at engine generator output terminals.
 - b. Initiates alarm when load current on engine generator is more than 110 percent of rated current for more than 60 seconds.
 - c. Overcurrent shutdown function matched to thermal damage curve of alternator.
- 7. Electronic Alternator Short-Circuit Protection: Shuts down generator, without instantaneous-trip function, when load current is more than 175 percent of rated current and combined time/current approaches thermal damage curve of alternator.
- 8. Loss of Excitation Monitor: Displays alarm on single-generator paralleling monitoring and control panel when generator controls sense loss of excitation to alternator while paralleled to the isolated paralleling bus.
- 9. Cool-Down, Time-Delay Control: Adjustable, zero to 600 seconds.
- 10. Start Time-Delay Control: Adjustable, zero to 300 seconds.
- 11. Frequency Control: Initiate an alarm condition when engine generator is below 90 percent of rated frequency for more than 20 seconds or is over the frequency.
- 12. Under- and Overvoltage Control: Initiate an alarm condition when the engine generator is at 90 percent voltage for more than 20 seconds or is over the voltage.

2.5 GENERATOR CONTROL PANEL

- A. Source Limitations: Obtain paralleling low-voltage switchgear from same manufacturer as required for transfer switches and engine generators.
- B. Description: Factory assembled and tested and complying with IEEE C37.20.1 and UL 1558.
- C. Ratings: Suitable for application in three-phase, 60-Hz, solidly grounded neutral system.
- D. Nominal System Voltage: 480/277 V, four wire, 60 Hz.
- E. Isolated Paralleling Bus: 800A.
 - 1. Phase-, Neutral-, and Ground-Bus Materials:
 - a. Phase and Neutral Bus: Copper, silver plated at connection points.
 - b. Ground Bus: Copper, plated; minimum size 1/4 by 2 inches.

2. Bus bars connect between vertical sections and between compartments. Cable connections are not permitted.
 - a. Uniform capacity for horizontal and vertical bus.
 - b. Neutral Bus: 100 percent of phase-bus ampacity, except as indicated.
 - c. Supports and Bracing for Buses: Adequate strength for indicated short-circuit currents.
- F. Short-Circuit Current: Match rating of highest-rated circuit breaker in switchgear assembly.
- G. Switchgear Fabrication:
1. Bus isolation barriers shall be arranged to isolate line bus from load bus at each main and tie circuit breaker.
 2. Circuit-breaker compartments shall be equipped to house circuit breakers and shall be fitted with hinged outer doors.
 3. Auxiliary Compartments: Match and align with basic switchgear assembly.
 - a. Bus transition sections.
 - b. Pull sections.
 - c. Hinged front panels for access to accessory and blank compartments.
 - d. Pull box on top of switchgear for extra room for pulling cable, with removable top, front, and side covers; and ventilation provisions adequate to maintain air temperature in pull box within same limits as switchgear.
 - 1) Set pull box back from front to clear circuit-breaker lifting mechanism.
 - 2) Bottom: Insulating, fire-resistive material with separate holes for cable drops into switchgear.
 - 3) Cable Supports: Arranged to ease cabling and adequate to support cables indicated, including those for future installation.
 - e. Neutral Disconnect Link: Bolted, uninsulated, 1/4-by-2-inch copper bus, arranged to connect neutral bus to ground bus.
 - f. Provide for future extensions from either end of main phase, neutral, and ground bus by means of predrilled bolt-holes and connecting links.
 - g. Bus-Bar Insulation: Individual bus bars wrapped with factory-applied, flame-retardant tape or spray-applied, flame-retardant insulation.
 - 1) Sprayed Insulation Thickness: 3 mils, minimum.
 - 2) Bolted Bus Joints: Insulate with secure joint covers that can easily be removed and reinstalled.
 4. Circuit-Breaker Terminals for Cable Connections: Silver-plated copper bus extensions equipped with pressure connectors for conductors.
- H. Circuit Breakers: Comply with IEEE C37.13, IEEE C37.16, and IEEE C37.17.
1. Ratings: As indicated for continuous, interrupting, and short-time current ratings for each circuit breaker; voltage and frequency ratings same as switchgear.
 2. Operating Mechanism: Mechanically and electrically trip-free, stored-energy operating mechanism with the following features:
 - a. Normal Closing Speed: Independent of both control and operator.
 - b. Slow Closing Speed: Optional with operator for inspection and adjustment.
 3. Trip Devices:

- a. Solid-state, overcurrent trip-device system consisting of one or two current transformers or sensors per phase, and a release mechanism.
 - b. Functions: Long-time-delay, short-time-delay, and instantaneous-trip functions, independent of each other in both action and adjustment.
 - c. Temperature Compensation: Ensures accuracy and calibration stability from minus 5 to plus 40 deg C.
 - d. Time-Current Characteristics: Field adjustable.
 - e. Current Adjustability: Dial settings and rating plugs on trip units or sensors on circuit breakers, or a combination of these methods.
 - f. Long-Time- and Short-Time-Delay Functions: Three bands, minimum; marked "minimum," "intermediate," and "maximum."
 - g. Pickup Points: Five minimum, for long-time- and short-time-trip functions. Equip short-time-trip function for switchable I-squared-t operation.
 - h. Pickup Points: Five minimum, for instantaneous-trip functions.
 - i. Trip Indication: Labeled, battery-powered lights or mechanical targets on trip device to indicate type of fault.
4. Auxiliary Contacts: For interlocking or remote indication of circuit-breaker position, with spare auxiliary switches and other auxiliary switches required for normal circuit-breaker operation, quantity as indicated. Each consists of two Type "a" and two Type "b" stages (contacts) wired through secondary disconnect devices to a terminal block in stationary housing.
5. Padlocking Provisions: For installing at least three padlocks on each circuit breaker to secure its enclosure and prevent movement of drawout mechanism.
6. Operating Handle: One for each circuit breaker capable of manual operation.
 - a. Generator Paralleling Circuit Breakers: Interlocked with system control so that circuit breaker does not close unless mode selector switch is in "Auto" position and engine generator is synchronized with the isolated paralleling bus.
- I. Door-Mounted Control Components: Industrial-type oiltight devices and digital-display indicator lamps.
- J. Control Power Supply:
 1. Control power transformer shall supply 120-V ac control circuits from the generator source through secondary disconnect devices.
 2. Include a control power transformer for each generator paralleling switchgear circuit breaker connected to the generator side of the circuit breaker.
 3. Include a control power transformer for each distribution paralleling switchgear circuit breaker.
 4. Dry-type transformers shall be in separate compartments for units larger than 3 kVA, including primary and secondary fuses.
 5. Two control power transformers in separate compartments with necessary interlocking relays; each transformer shall be connected to line side of associated main circuit breaker.
 - a. Secondary windings shall be connected through relay(s) to control bus to effect an automatic transfer scheme.
 - b. Secondary windings shall be connected through an internal automatic transfer switch to paralleling switchgear control power bus.
 6. Control Power Fuses: Primary and secondary fuses shall provide current-limiting and overload protection.

- K. Control Wiring:
1. Factory installed, complete with bundling, lacing, and protection.
 2. Provide flexible conductors for No. 8 AWG and smaller, for conductors across hinges and for conductors for interconnections between shipping units.
 3. Conductors shall be sized according to NFPA 70 for duty required.
- L. Identification: Comply with requirements in Section 260553 "Identification for Electrical Systems" for electrical identification devices and installation.
1. Identify units, devices, controls, and wiring.
 2. Mimic Bus: Continuous mimic bus, applied to front of paralleling low-voltage switchgear, arranged in one-line diagram format, using symbols and lettered designations consistent with approved mimic-bus diagram.
 - a. Mimic-bus segments coordinated with devices in paralleling low-voltage switchgear sections to which applied, to produce a concise visual presentation of principal paralleling switchgear components and connections.
 - b. Medium: Painted graphics, as selected by Director's Representative.
 - c. Color: Contrasting with factory-finish back ground; as selected by Director's Representative from manufacturer's full range.
- M. Outdoor Enclosure Fabrication Requirements: N E M A 3 R Galvanized steel, weatherproof; integral structural-steel base frame with factory-applied asphaltic undercoating.
1. Features for Each Compartment or Group of Compartments:
 - a. Thermostatically controlled air-conditioning units sized to prevent temperatures exceeding 80 deg F.
 - b. Space heater operating at one-half or less of rated voltage, sized to prevent condensation.
 - c. Louvers equipped with insect and rodent screen and filter; arranged to permit air circulation while excluding insects, rodents, and exterior dust.
 - d. Hinged front door with locking provisions.
 - e. Interior light with switch.
 - f. Weatherproof ground-fault circuit-interrupter duplex receptacle.
 - g. Power for air conditioning, heaters, lights, and receptacles to be provided from control power transformer.
- N. Finish: Manufacturer's standard gray finish over a rust-inhibiting primer on phosphatizing-treated metal surfaces.
- O. Accessories:
1. Tools for circuit-breaker and switchgear tests, inspections, maintenance, and operation.
 2. Racking handle to manually move circuit breaker between connected and disconnected positions.
 3. Portable test set for testing all functions of circuit-breaker, solid-state trip devices without removal from switchgear.
 4. Relay and meter test plugs suitable for testing switchgear meters and switchgear class relays.

2.6 IDENTIFICATION

- A. Compartment Nameplates: Engraved, laminated acrylic, as described in Section 260553 "Identification for Electrical Systems," for each compartment, mounted with corrosion-resistant screws.

2.7 SOURCE QUALITY CONTROL

- A. Testing: Test and inspect paralleling low-voltage switchgear, with generators and transfer switches, at paralleling low-voltage switchgear manufacturer's factory.
 - 1. Engine Generator:
 - a. NETA ATS, 7.22.1, "Emergency Systems, Engine Generator."
 - b. NETA ATS, 7.15.1, "Rotating Machinery, AC Motors & Generator."
 - 2. Automatic Transfer Switches:
 - a. NETA ATS, 7.22.3, "Emergency System, Automatic Transfer Switches."
- B. Verification of Performance: Rate paralleling low-voltage switchgear, with generators and transfer switches, according to operation of functions and features specified.
- C. Paralleling low-voltage switchgear, with generators and transfer switches, will be considered defective if it does not pass tests and inspections.
- D. Coordinate scheduling of the factory witness test with Director's Representative. Perform successfully tests prior to witness test.
- E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, where paralleling low-voltage switchgear will be installed for compliance with installation tolerances, required clearances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1 and applicable portions in NECA 400.
- B. Equipment Mounting:
 - 1. Install paralleling low-voltage switchgear on cast-in-place concrete equipment base(s). Coordinate with H-Contract.

- C. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, brackets, and temporary blocking of moving parts from paralleling low-voltage switchgear units and components.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Section 260553 "Identification for Electrical Systems."
- B. Diagrams and Instructions:
 - 1. Frame and mount under clear acrylic plastic on front of paralleling low-voltage switchgear.
 - a. Operating Instructions: Printed basic instructions for paralleling low-voltage switchgear, including control and key-interlock sequences and emergency procedures.
 - b. System Power Riser Diagrams: Depict power sources, feeders, distribution components, and major loads.
 - 2. Storage for Maintenance: Include a rack or holder, near the operating instructions, for a copy of maintenance manual.

3.4 CONNECTIONS

- A. Comply with grounding and bonding requirements in Section 260526 "Grounding and Bonding for Electrical Systems."
- B. Comply with wire and cable requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.5 FIELD QUALITY CONTROL

- A. Prepare for acceptance tests as follows:
 - 1. Test insulation resistance for each switchgear bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
 - 3. Inspect paralleling switchgear installation, including wiring, components, connections, and equipment. Test and adjust components and equipment.
 - 4. Verify that electrical control wiring installation complies with manufacturer's submittal by means of point-to-point continuity testing.
 - 5. Complete installation and startup checks according to manufacturer's written instructions.
- B. Testing Agency: Director's Representative will engage a qualified testing agency to perform tests and inspections.
- C. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- D. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

- E. Perform tests and inspections with the assistance of a factory-authorized service representative.
- F. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA ATS. Certify compliance with test parameters. Perform NETA tests and inspections for each of the following NETA categories:
 - a. AC generators and emergency systems.
 - b. Switchgear.
 - c. Circuit breakers.
 - d. Instrument transformers.
 - e. Metering and instrumentation.
 - f. Ground-fault systems.
 - g. Battery systems.
 - h. Surge arresters.
 - i. Capacitors.
 - 2. Perform NFPA 100 tests for Type 1 essential power systems.
- G. Paralleling low-voltage switchgear will be considered defective if it does not pass tests and inspections.
- H. Prepare test and inspection reports.
- I. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchgear. Remove front and rear panels so joints and connections are accessible to portable scanner.
 - 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchgear 11 months after date of Substantial Completion.
 - 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - 3. Record of Infrared Scanning: Prepare a certified report that identifies switchgear checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- J. Test sequence of operation step by step for each mode.

3.6 ADJUSTING

- A. Set field-adjustable, electronic circuit-breaker trip characteristics according to results specified in Section 260573.16 "Coordination Studies."
- B. Set field-adjustable, electronic circuit-breaker trip characteristics.

3.7 CLEANING

- A. On completion of installation, inspect interior and exterior of paralleling low-voltage switchgear. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair damaged finishes.

3.8 PROTECTION

- A. Temporary Heating: Apply temporary heat to paralleling low-voltage switchgear, according to manufacturer's written instructions, throughout periods when paralleling switchgear environment is not controlled for temperature and humidity within manufacturer's stipulated service conditions.

3.9 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Facility maintenance personnel to adjust, operate, and maintain paralleling low-voltage switchgear.

END OF SECTION

SECTION 310000 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

- 1. Excavation required for removal of existing electrical conduit, duct banks, concrete encasement, handholes, boxes, and other below-grade electrical work indicated on the Electrical Drawings.
- 2. Excavation required for installation of electrical conduits, duct banks, handholes, boxes, structures, grounding systems, and other below-grade electrical work indicated on the Electrical Drawings.
 - a. Bedding and cushion material for electrical conduits and duct banks.
 - b. Initial and final trench backfill.
 - c. Compaction and preparation of restoration subgrade.
 - d. Localized dewatering, trench support, protection of existing utilities and improvements, and disposal of excess or unsuitable excavated material associated with Electrical Work.

- B. Contract Responsibility:

- 1. Electrical Work Contractor: Perform excavation, below-grade electrical removals, bedding, backfill, and compaction required for Electrical Work. Provide compacted backfill to restoration subgrade elevation.
- 2. HVAC Work Contractor: Perform sawcutting and removal of asphalt pavement, concrete pavement, sidewalks, concrete pads, curbs, and other hard surface construction required to expose areas for Electrical Contract excavation. Provide final surface restoration after Electrical Work Contractor completes and compacts backfill, including pavement, concrete, curbs, topsoil, turf, landscaping, and finish grading.
- 3. Electrical Work Contractor: Coordinate excavation limits, restoration subgrade elevations, and sequencing with the HVAC Work Contractor and Director's Representative. Do not excavate beneath hard surface construction until the HVAC Work Contractor has completed required surface removal. Maintain excavation and compacted backfill in condition suitable for restoration.
- 4. Projectwide erosion and sediment controls shown on the Civil Drawings are provided by the HVAC Work Contractor. Protect those controls and provide localized temporary measures required to prevent erosion or sediment migration caused by Electrical Work operations.

1.3 REFERENCE STANDARDS

A. ASTM International:

1. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
2. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
3. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

B. Other Requirements:

1. Local utility standards when working in close proximity to utility lines.
2. Occupational Safety and Health Administration: Comply with applicable requirements of 29 CFR Part 1926 for excavation, trenching, and construction safety.

1.4 DEFINITIONS

A. Backfill: Soil or aggregate material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over direct-buried conduit or other electrical work to the elevation required before final backfill.
2. Final Backfill: Backfill placed over initial backfill or concrete-encased duct bank to restoration subgrade elevation.

B. Unsuitable Material: Material containing cinders, industrial waste, sludge, construction rubble, landfill material, muck, peat, frozen material, organic material, or other material unacceptable for compacted backfill.

C. Subgrade: Uppermost surface of an excavation or compacted fill immediately below bedding, backfill, or restoration materials.

D. Restoration Subgrade: Upper surface of Electrical Contract backfill, compacted and graded to the elevation required to receive surface restoration by the HVAC Work Contractor.

E. Bedding Course (Cushion Material): Aggregate layer placed on the trench bottom and around direct-buried electrical conduit where indicated.

F. Utilities: On-site underground pipes, conduits, ducts, cables, and related underground services.

1.5 MATERIAL OWNERSHIP

A. Except for materials indicated to remain State property, excess and unsuitable excavated materials removed from the Project site become Contractor property and shall be legally disposed of off State property.

1.6 SUBMITTALS

- A. Submittals for this Section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
- B. Product Data: For all items specified.
- C. Existing Conditions: Before earthwork begins, document existing adjoining construction and site improvements that might be misconstrued as damage caused by Electrical Work operations.
 - 1. Use sufficiently detailed photographs or video recordings.

1.7 FIELD CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Director's Representative and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Director's Representative or authorities having jurisdiction.
- B. Utility Locating: Locate and identify underground utilities before beginning excavation. Coordinate utility locations with the Director's Representative and other contracts.
- C. Do not commence excavation until required erosion and sediment controls are in place and the HVAC Work Contractor has completed hard surface removals required for access to the excavation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. See Section 310001 - Earthwork Materials.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Protect existing structures, utilities, pavements, curbs, sidewalks, vegetation, and other site features to remain from damage caused by excavation, settlement, lateral movement, undermining, washout, or construction operations.
- C. Protect and maintain erosion and sediment controls within and adjacent to Electrical Work areas. Repair damage caused by Electrical Work operations.

3.2 EXISTING UTILITIES

- A. Locate, identify, disconnect, cap, seal, abandon, or remove existing electrical utilities where indicated on the Electrical Drawings.
 - 1. Arrange utility shutdowns as required and coordinate with the Director's Representative.
- B. Interrupting Existing Utilities: Do not interrupt utilities serving occupied facilities except with prior written permission from the Director's Representative and after temporary service requirements have been coordinated.
 - 1. Notify Director's Representative not less than seven days in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without the Director's Representative's written permission.
- C. Excavate for and remove existing underground electrical conduits, duct banks, concrete encasement, handholes, boxes, and related below-grade electrical construction where indicated for removal.

3.3 SURFACE REMOVAL AND RESTORATION COORDINATION

- A. Coordinate the limits and sequence of Electrical Contract excavation with the HVAC Work Contractor before disturbing existing surfaces.
 - 1. Hard Surface Removal: Sawcutting and removal of asphalt pavement, concrete pavement, sidewalks, concrete pads, curbs, and similar hard surface construction required to expose Electrical Contract excavation is work of the HVAC Work Contractor.
 - 2. Lawn and Landscaped Areas: Electrical Work Contractor may remove sod, topsoil, and soil within trench limits as required for excavation. Final topsoil, turf, landscaping, and finish grading are work of the HVAC Work Contractor.
 - 3. Surface Restoration: Asphalt, concrete, curbs, sidewalks, topsoil, turf, landscaping, and other finish surface restoration disturbed by Electrical Work is work of the HVAC Work Contractor.
 - 4. Electrical Work Contractor shall provide compacted backfill to restoration subgrade and shall maintain the restoration subgrade until accepted for restoration by the HVAC Work Contractor and Director's Representative.
- B. Limit excavation and disturbance to the minimum area required for Electrical Work. Protect adjacent surfaces designated to remain.
 - 1. Repair damage to adjacent surfaces and improvements caused by Electrical Work operations beyond the coordinated removal limits, as directed by the Director's Representative.

3.4 STORAGE OF SOIL MATERIALS

- A. Stockpile excavated material proposed for reuse separately from unsuitable or waste material, away from excavation edges. Grade and shape stockpiles to drain and prevent erosion or migration of material.

1. Locate stockpiles as approved by the Director's Representative and so they do not obstruct traffic, access, drainage, or other contract work.
2. Remove excess and unsuitable material from the site as specified in this Section.

3.5 DEWATERING

- A. Provide localized dewatering required to keep Electrical Work excavations dry and stable and to permit installation, inspection, bedding, backfill, and compaction.
- B. Prevent surface water and groundwater from entering excavations, ponding on prepared subgrades, or flooding the Project site or surrounding areas.
- C. Protect trench bottoms and subgrades from softening, undermining, washout, or other damage caused by water.
 1. Reroute surface runoff away from excavations. Do not use excavated trenches as temporary drainage ditches.
- D. Dispose of water removed by dewatering in a manner that avoids damage, sediment discharge, inconvenience, or violation of applicable requirements.

3.6 SHEETING, SHORING, AND BRACING

- A. Install temporary sheeting, shoring, and bracing as required for safe excavation and to prevent settlement or damage to adjacent ground, utilities, structures, and improvements. Coordinate with other contract work and remove temporary support when no longer required.

3.7 EXCAVATION

- A. Excavate trenches and pits required for Electrical Work to the lines, depths, and elevations indicated on the Electrical Drawings and in Section 260543.
- B. Trench Width:
 1. Provide sufficient trench width for installation of conduits, duct banks, concrete encasement, handholes, boxes, bedding, and required compaction.
 2. Where trench width or duct-bank excavation dimensions are indicated on the Electrical Drawings or in Section 260543, those requirements govern.
 3. Do not widen excavations beyond the limits reasonably required for the Work without approval of the Director's Representative.
- C. Trench Bottoms: Excavate to provide firm, uniform support and the depth required for bedding or cushion material indicated on the Electrical Drawings and in Section 260543. Remove loose or unsuitable material from trench bottoms.
 1. Use hand excavation or other controlled methods near existing utilities and improvements where mechanical excavation could cause damage.

- D. Existing Electrical Removals: Excavate as required to remove below-grade electrical construction indicated for removal.
 - 1. Remove conduit, duct banks, concrete encasement, handholes, boxes, and associated below-grade electrical materials to the limits indicated.
 - 2. Protect existing utilities and construction indicated to remain. Immediately notify the Director's Representative of conflicts or undocumented utilities encountered during excavation.
 - 3. If rock or an unexpected subsurface obstruction that cannot be removed by conventional excavation equipment is encountered, notify the Director's Representative before proceeding.
- E. Keep excavations within coordinated limits and do not undermine adjacent pavement, curbs, structures, utilities, or other improvements to remain.

3.8 UNAUTHORIZED EXCAVATION

- A. Backfill unauthorized excavation with Select Granular Material or Selected Fill, as directed by the Director's Representative, and compact to the requirements of this Section without additional compensation.
- B. Correct damage or instability caused by unauthorized excavation as directed by the Director's Representative without additional compensation.

3.9 SUBGRADE INSPECTION

- A. Notify Director's Representative when trench bottoms and other excavated subgrades have reached required elevation and are ready for inspection.
- B. If the Director's Representative determines that unsuitable material, soft spots, pumping, or unstable conditions are present, excavate and replace with Select Granular Material or other approved material as directed.
- C. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- D. Reconstruct subgrades damaged by freezing, frost, rain, accumulated water, or construction activities, as directed by the Director's Representative, without additional compensation.

3.10 BACKFILL & SOIL FILL

- A. Place and compact backfill promptly, but not before completing the following:
 - 1. Surveying and recording locations of underground electrical utilities for Record Documents.
 - 2. Testing and inspecting underground electrical work.
 - 3. Removing trash, debris, and unsuitable material from the excavation.
 - 4. Removing temporary shoring, bracing, and sheeting where removal is required before backfilling.
 - 5. Acceptance by the Director's Representative of construction below grade.

- B. Place fill and backfill on subgrades free of mud, frost, snow, ice, standing water, and loose material.
- C. Place final backfill in lifts not exceeding 4 inches in loose depth. Moisture-condition each lift as required and compact before placing the next lift.
- D. Utility Trench Backfill
 - 1. Place and compact bedding or cushion material on trench bottoms and around direct-buried conduit where indicated. Provide continuous, uniform support without damaging or displacing electrical work.
 - 2. Backfill voids as shoring and bracing are removed. Do not leave voids beneath or adjacent to conduits, duct banks, handholes, boxes, or structures.
 - 3. Initial Backfill:
 - a. Direct-Buried Conduit: Place Cushion Material in the locations and thicknesses indicated on the Electrical Drawings and in Section 260543.
 - 1) Compact initial backfill carefully and evenly on both sides of conduits to prevent damage, displacement, or loss of alignment.
 - b. Concrete-Encased Duct Banks: Do not place backfill until concrete encasement has been inspected and has attained sufficient strength to resist damage from backfilling and compaction operations.
 - 4. Coordinate backfilling with required electrical testing and inspections.
 - 5. Final Backfill:
 - a. Place and compact Selected Fill from the top of initial backfill or concrete encasement to restoration subgrade elevation. Excavated material meeting the requirements for Selected Fill may be reused.
- E. Restoration Subgrade:
 - 1. Terminate Electrical Contract backfill at the elevation required to receive HVAC Contract surface restoration. In lawn and landscaped areas, terminate backfill 4 inches below finished grade unless otherwise indicated. In pavement, concrete, curb, and similar hard-surface areas, coordinate restoration subgrade elevation with applicable restoration details. Do not place HVAC Contract surface restoration materials.

3.11 SOIL MOISTURE CONTROL

- A. Where backfill requires moisture conditioning before compaction, uniformly add water or aerate material as necessary to achieve moisture content suitable for specified compaction.
- B. Prevent ponding or free water on the surface during and after compaction operations.
- C. Remove and replace, or scarify and air dry, soil that is too wet to permit compaction to specified density.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Compact trench bedding and backfill to not less than the following percentages of maximum dry density according to ASTM D698:
 - 1. Bedding and cushion material: 95 percent.
 - 2. Initial and final trench backfill: 95 percent.
 - 3. Restoration subgrade: 95 percent.
 - 4. Use compaction equipment and methods that do not damage or displace conduits, duct banks, handholes, boxes, or adjacent utilities and improvements.

3.13 FIELD QUALITY CONTROL

- A. Testing Agency: Director's Representative will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- B. Coordinate with and allow testing agency to inspect and test trench subgrades and backfill. Provide testing agency a minimum of three working days advance notice before backfilling operations requiring testing.
- C. Testing agency will test compaction of trench backfill in place according to ASTM D698.
 - 1. Trench Backfill: Test each compacted initial and final backfill layer at least once for every 150 feet of trench or less, but not fewer than two tests for each testable trench segment unless otherwise directed by the Director's Representative.
- D. When testing indicates that required compaction has not been achieved, scarify and moisture-condition, or remove and replace material as required; recompact and retest until specified compaction is obtained.

3.14 PROTECTION

- A. Protect compacted backfill and restoration subgrade from traffic, freezing, erosion, saturation, and disturbance. Keep areas free of trash and debris.
- B. Maintain restoration subgrade until accepted for surface restoration by the HVAC Work Contractor and Director's Representative.
 - 1. Repair settlement, rutting, erosion, loss of compaction, or other damage attributable to Electrical Work operations. Reshape and recompact as required.

3.15 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove from State property and legally dispose of excess and unsuitable excavated materials, removed below-grade electrical materials, trash, and debris unless otherwise directed by the Director's Representative.

END OF SECTION 310000

SECTION 310001 - EARTHWORK MATERIALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Soil and aggregate materials.

1.3 REFERENCE STANDARDS

- A. Applicable Standards:
 - 1. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
 - 2. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - 3. NYSDOT 703 - Aggregates.

1.4 SUBMITTALS

- A. Submittals for this Section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
- B. Product Data: For all items specified.
- C. Submittals shall be provided in the order in which they are specified and tabbed when combined.
- D. Material Test Reports: For each borrow soil material proposed for fill and backfill as follows:
 - 1. Classification according to ASTM D2487.
 - 2. Laboratory compaction curve according to ASTM D698.
- E. Samples: Provide Director's Representative with laboratory test results for gradation, Proctor, and soundness tests for the following materials:
 - 1. Select Granular Material: 50 - 60 lb. (Two Samples).
 - 2. Selected Fill: 40 - 50 lb.
 - 3. Cushion Material: 30 lb.

4. No. 1 Coarse Aggregate: 30 lb.

F. Source Quality-Control Submittals:

1. Select Granular Material and No. 1 Coarse Aggregate: Provide name and location of source and NYSDOT Source Number. If material is not from an approved NYSDOT source, provide gradation and soundness test results from an ASTM certified soils laboratory.

G. Supplier's Certificate: Certify that products meet or exceed specified requirements.

1.5 QUALITY ASSURANCE

A. Furnish each aggregate material from a single source throughout the Work.

PART 2 - PRODUCTS

2.1 SOIL/STONE MATERIALS

A. Select Granular Material.

1. Description: Stockpiled, sound, durable, sand, gravel, stone, or blends of these materials.
2. Quality: Free of organic and other deleterious materials.
3. Magnesium Sulfate Soundness Test: 20% maximum loss by weight after four test cycles.
4. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
5. Elongated Particles: Not more than 30%, by weight, of the particles retained on a ½ inch sieve will consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.
6. Comply with the gradation requirements specified below:

Sieve Size	Percent Passing
2 inch	100
1/4 inch	30-65
No. 40	5-40
No. 200	0-10

B. Selected Fill.

1. Source: Excavated and reused material meeting the requirements of this Article. Provide imported borrow where excavated material is insufficient or unsuitable.
2. Description: Sound, durable, sand, gravel, stone, or blends of these materials.
3. Quality: Free of organic and other deleterious materials.
4. Comply with the gradation requirements specified below:

Sieve Size	Percent Passing
4 inch	100
No. 40	0-70
No. 200	0-15

C. Cushion Material.

1. Description: Clean, hard, durable, uncoated particles.
2. Quality: Free from lumps of clay and all deleterious substances.
3. Comply with the gradation requirements specified below:

Sieve Size	Percent Passing
1/4 inch	100
No. 60	0-35
No. 100	0-10

D. No. 1 Coarse Aggregate.

1. Description: Crushed stone complying with NYSDOT Article 703-02. Use beneath electrical handholes and boxes where indicated on the Electrical Drawings or in Section 260543.
2. Comply with the gradation requirements specified below:

Sieve Size	Percent Passing
1 inch	100
1/2 inch	90-100
1/4 inch	0-15

PART 3 - EXECUTION (NOT USED)

END OF SECTION 310001

POWER LEGEND	
	PANEL, EXISTING TO REMAIN
	PANEL, TO BE REPLACED WITH NEW
	PANEL, NEW
	JUNCTION BOX
	PULL BOX OR HAND HOLE
	MECHANICAL EQUIPMENT TO BE DEMOLISHED
	EQUIPMENT CONNECTION SYMBOL, REFER TO EQUIPMENT CONNECTION SCHEDULE
	MAGNETIC MOTOR STARTER
	COMBINATION MAGNETIC STARTER / FUSED DISCONNECT
	600 V HEAVY DUTY NON-FUSED DISCONNECT SWITCH "AF" - INDICATES FRAME SIZE "P" - INDICATED # OF POLES
	600 V HEAVY DUTY FUSED DISCONNECT SWITCH "AF" - INDICATES FRAME SIZE "AT" - INDICATES FUSED TRIP SIZE "P" - INDICATED # OF POLES
	MOTOR RATED SNAP SWITCH WITH OVERLOADS
	GROUNDING BUS BAR
	EMERGENCY OFF BUTTON (TYPE AS NOTED)
	EMERGENCY OFF BUTTON (TYPE AS NOTED)
	POINT OF CONNECTION
	HARD EQUIPMENT CONNECTION
	ELECTRICAL MANHOLE - ## ASSIGNED IDENTIFIER
	VARIABLE SPEED MOTOR CONTROLLER W/ INTEGRAL DISCONNECT

COMMUNICATIONS LEGEND	
	WIRELESS ACCESS POINT
	PLAIN OUTSIDE TELEPHONE LINE (POTS)
	COMMUNICATIONS OUTLET, #D - DENOTES QUANTITY OF CAT 6A DATA CABLES / OUTLETS (TESTED AND TERMINATED)
	SIGNAL MANHOLE - ## ASSIGNED IDENTIFIER
TEXT ADJACENT TO COMMUNICATION DEVICES INDICATES CONFIGURATION AND / OR MOUNTING HEIGHT. REFER TO LIST BELOW FOR DEFINITIONS:	
AC	MOUNT DEVICE ABOVE COUNTER HEIGHT. COORDINATE WITH OTHER TRADES TO DETERMINE PROPOSED COUNTER HEIGHT PRIOR TO MOUNTING DEVICE.
#D	NUMBER INDICATES QUANTITY OF INDIVIDUAL DATA JACKS REQUIRED AT THAT LOCATION. TERMINATE IN NEAREST DATA RACK, UNO.
#T	NUMBER INDICATES QUANTITY OF INDIVIDUAL TELEPHONE JACKS REQUIRED AT THAT LOCATION. TERMINATE TO TELEPHONE INTERFACE.
XX"	MOUNT DEVICE AT INDICATED LEVEL ABOVE FINISHED FLOOR (AFF).
ADMIN	ADMINISTRATIVE MASTER HANDSET

CIRCUITING LEGEND	
	SINGLE PHASE HOMERUN TO PANEL "LP2A", BREAKER #1, CIRCUIT USING (2)#12, (1)#12G, 3/4"C., UNO.
	THREE PHASE HOMERUN TO PANEL "LP2A", BREAKERS # 1,3,5 (NUMBER OF CIRCUITS INDICATED BY QUANTITY OF ARROW HEADS). CIRCUIT USING (3) #12, (1) #12G, 3/4"C., UNO.

LIGHTING LEGEND	
	LIGHT FIXTURES (LUMINAIRES) UPPERCASE TEXT # DENOTES TYPE LOWER CASE LETTER INDICATES SWITCH
	LIGHT FIXTURES (LUMINAIRES) UPPERCASE TEXT # DENOTES TYPE LOWER CASE LETTER INDICATES SWITCH
	EMERGENCY BATTERY UNIT UPPERCASE TEXT # DENOTES TYPE
	REMOTE EMERGENCY LIGHT UPPERCASE TEXT # DENOTES TYPE
	EXIT LIGHT FIXTURE, SINGLE FACED, UPPER CASE TEXT # DENOTES TYPE
	EXIT LIGHT FIXTURE, DOUBLE FACED, UPPER CASE TEXT # DENOTES TYPE
	COMBINED EMERGENCY BATTERY UNIT AND EXIT LIGHT FIXTURE UPPER CASE TEXT # DENOTES TYPE
	AREA OF REFUGE FIXTURE, UPPER CASE TEXT # DENOTES TYPE
	MULTI-POLE CONTACTOR, QUANTITY, OF POLES AS INDICATED ON PLANS
	TIME CLOCK, TYPE AS SPECIFIED

ELECTRICAL SYMBOL / TAG LEGEND	
	DASHED AND/OR HATCHED INDICATES EXISTING EQUIPMENT TO BE REMOVED
	SOLID LIGHT INDICATES EXISTING TO REMAIN EQUIPMENT OR WORK / EQUIPMENT BY OTHERS
	HEAVY & SOLID INDICATES EQUIPMENT TO BE PROVIDED NEW
ETR	EXISTING EQUIPMENT TO REMAIN, MAINTAIN EXISTING ELECTRICAL CONNECTIONS UNLESS OTHERWISE NOTED.
RE	EXISTING EQUIPMENT TO BE REMOVED AND RELOCATED AS SHOWN, DISCONNECT AND REMOVE, REINSTALL AT NEW LOCATION AND RECONNECT ITEM AS REQUIRED
R	EXISTING EQUIPMENT TO BE REMOVED AND REPLACED WITH NEW.

WIRING DEVICES LEGEND	
	SINGLE RECEPTACLE
	DUPLEX RECEPTACLE
	EXPLOSION RESISTENT RECEPTACLE
	GROUND FAULT CIRCUIT INTERRUPTER
	PROTECTED DUPLEX RECEPTACLE
	DOUBLE DUPLEX RECEPTACLE

FIRE ALARM LEGEND	
	MANUAL PULL STATION
	AUDIO / VISUAL SIGNAL DEVICE
	#dcd INDICATES STROBE INTENSITY
	VISUAL ONLY SIGNAL DEVICE,
	#dcd INDICATES STROBE INTENSITY
	VOICE EVAC AUDIO / VISUAL SIGNAL DEVICE, ##cd
	INDICATES STROBE INTENSITY
	VOICE EVAC AUDIO ONLY SIGNAL DEVICE.
	SMOKE DETECTOR
	SMOKE DETECTOR W/ AUXILIARY CONTACTS
	CARBON MONOXIDE DETECTOR
	RATE OF RISE HEAT DETECTOR
	FIXED TEMPERATURE HEAT DETECTOR
	CARBON MONOXIDE DETECTOR
	MAGNETIC DOOR HOLDER

SITE SYMBOLS LEGEND	
	EXISTING TO REMAIN, UNDERGROUND POWER
	REMOVE UNDERGROUND POWER
	PROVIDE UNDERGROUND POWER
	EXISTING TO REMAIN UNDERGROUND COMMUNICATIONS / SIGNAL
	REMOVE EXISTING UNDERGROUND COMMUNICATIONS / SIGNAL
	PROVIDE UNDERGROUND COMMUNICATIONS / SIGNAL
	EXISTING TO REMAIN UNDERGROUND SANITARY
	EXISTING TO REMAIN UNDERGROUND STORM
	EXISTING TO REMAIN EXPOSED STORM
	EXISTING TO REMAIN WATER

GENERAL NOTES	
A.	CONTRACT DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY AND MUST BE SO CONSTRUED TO DETERMINE THE FULL SCOPE OF WORK. REFERENCES TO CODES, SPECIFICATIONS, AND STANDARDS CALLED FOR IN THE SPECIFICATION SECTIONS AND ON THE DRAWINGS MEAN, THE LATEST EDITION, AMENDMENT, AND REVISION OF SUCH REFERENCED STANDARD/CODE IN EFFECT ON THE DATE OF THESE CONTRACT DOCUMENTS.
B.	CONTRACT DRAWINGS ARE, IN PART, DIAGRAMMATIC AND ARE INTENDED TO CONVEY THE SCOPE OF THE WORK AND INDICATE THE GENERAL ARRANGEMENT OF THE EQUIPMENT. FOLLOW THESE DRAWINGS IN LAYING OUT THE WORK. CONSULT ALL DRAWINGS OF ALL TRADES TO BECOME FAMILIAR WITH ALL CONDITIONS AFFECTING THE WORK AND TO VERIFY SPACES IN WHICH THE WORK WILL BE INSTALLED. PROVIDE ALL ACCESSORIES REQUIRED FOR A COMPLETE, OPERATIONAL, AND SATISFACTORY INSTALLATION READY FOR CONTINUOUS USE.
C.	COORDINATE ELECTRICAL SEQUENCING WORK WITH DIRECTOR'S REPRESENTATIVE AND H-CONTRACT. NO POWER OUTAGES SHALL OCCUR WITHOUT DIRECTOR'S REPRESENTATIVE'S PRIOR KNOWLEDGE. PROVIDE TWO WEEKS WRITTEN NOTICE OF ALL POWER INTERRUPTIONS.
D.	COORDINATE EXACT LOCATION OF ALL CONDUIT ROUTES, EQUIPMENT, AND DEVICES WITH EXISTING CONDITIONS PRIOR TO CONSTRUCTION. COORDINATE ARRANGEMENT, MOUNTING, AND SUPPORT OF ELECTRICAL CONDUITS TO ALLOW MAXIMUM POSSIBLE HEADROOM IN THE CEILING CAVITIES.
E.	MAINTAIN WORKING ACCESS AND EQUIPMENT CLEARANCES ABOUT CLEARANCES OF ALL EQUIPMENT, PER NEC ARTICLE 110.
F.	MINIMUM CONDUIT SIZE IS TO BE 3/4" FOR ALL CIRCUITS UNO. PROVIDE NYLON PULL STRING IN ALL EMPTY SPARE CONDUITS.
G.	WHEREVER POSSIBLE REUSE EXISTING CONDUIT, RACEWAY, AND BACK BOXES IF IN GOOD CONDITION. EXTENDING/INSTALL CONDUIT/RACEWAY AS REQUIRED FOR PROPER MOUNTING OF DEVICES. CONCEAL ABOVE CEILING OR WITHIN WALL WHERE POSSIBLE.
H.	WHERE RELOCATING EXISTING COMPONENTS; PROVIDE MATCHING BRANCH CIRCUITRY TO RELOCATE EQUIPMENT, DEVICES, ETC. MAINTAIN FEED-THROUGH WIRING AND SYSTEMS SCHEDULED TO REMAIN.
I.	ALL CIRCUIT BREAKERS INSTALLED IN EXISTING POWER PANEL ARE TO BE LISTED/LABELED FOR USE WITHIN EXISTING PANEL AND ARE TO MATCH EXISTING PANEL POWER CHARACTERISTICS AND KAIC RATINGS. VERIFY EXISTING POWER CHARACTERISTICS IN FIELD, PRIOR TO START OF WORK
J.	CUT AND PATCH BUILDING CONSTRUCTION AS REQUIRED TO ACCOMPLISH WORK OF THIS CONTRACT, UNO. OBTAIN WRITTEN AUTHORIZATION FROM DIRECTOR'S REPRESENTATIVE ENGINEER PRIOR TO PENETRATING OR CUTTING ANY STRUCTURAL COMPONENTS.
K.	FIELD VERIFY ALL EXISTING CONDUITS AND DIMENSIONS PRIOR TO COMMENCEMENT OF WORK OR SHOP FABRICATION. REPORT ALL DISCREPANCIES TO DIRECTOR'S REPRESENTATIVE IN WRITING.
L.	PROVIDE ALL NECESSARY SUPPORT FRAMING, STIFFENERS, BRACING, AND HANGERS WHETHER SHOWN OR NOT TO ENSURE A COMPLETE AND DURABLE SYSTEM. ACTUAL SUPPORTS MAY VARY FORM THOSE SHOWN IN DETAILS AND AS REQUIRED FOR EQUIPMENT TO BE FURNISHED OR FOR EXISTING FIELD CONDITIONS.
M.	PROVIDE ALL PROVIDE ALL RACEWAY, POWER DEVICES, POWER CIRCUITRY. COORDINATE EXACT LOCATIONS AND CONFIGURATIONS WITH THE DIRECTOR'S REPRESENTATIVE PRIOR TO INSTALLATION.
N.	PATCH TO MATCH EXISTING CONDITIONS ALL DAMAGED SURFACES RESULTING FROM WORK PERFORMED UNDER THE CONTRACT. PATCH/REFINISH SURFACE TO MATCH EXISTING WHERE DEVICES/FIXTURES.
O.	"CIRCUITRY" INCLUDES: CONDUCTORS, WIRES, CABLES, RACEWAYS, FITTINGS, JUNCTION BOXES, PULL BOXES HANGERS, SUPPORTS AND ACCESSORIES.
P.	THOROUGHLY COORDINATE ALL ASPECTS OF PROJECT STAGING WITH DIRECTOR'S REPRESENTATIVE, C-CONTRACT, AND H-CONTRACT PRIOR TO START OF WORK.

ABBREVIATIONS			
ABBREVIATIONS: (NOTE, NOT ALL ABBREVIATIONS USED THIS PROJECT)			
A	AMPERE	LED	LIGHT-EMITTING DIODE
AF	AMPS FRAME	LCD	LIQUID CRYSTAL DISPLAY
ACM	ASBESTOS CONTAINING MATERIAL	LTC	LIGHTING
AGP	ABOVE GROUND PULLBOX	MAX	MAXIMUM
AL	ALUMINUM	MCC	MOTOR CONTROL CENTER
AR	AMPS RATED	MCCB	MOLDED-CASE CIRCUIT BREAKER
AT	AMPS TRIP	MCM	THOUSAND CIRCULAR MILS
ATS	AUTOMATIC TRANSFER SWITCH	MCP	MOTOR CIRCUIT PROTECTOR
AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS	MDP	MAIN DISTRIBUTION PANEL
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS	MDS	METAL ENCLOSURE MAIN DISTRIBUTION SWITCHBOARD
AUTO	AUTOMATIC	MIN	MINIMUM
AUX	AUXILIARY	MTS	MANUAL TRANSFER SWITCH NEUTRAL
AWG	AMERICAN WIRE GAUGE	NC	NORMALLY CLOSED
BLWR	BLOWER	NEC	NATIONAL ELECTRICAL CODE
BCP	BLOWER CONTROL PANEL	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
BFP	BOILER FEED PUMP	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
BP	BOOSTER PUMP	NOT IN CONTRACT	NOT IN CONTRACT
BPCP	BOOSTER PUMP CONTROL PANEL	NO	NORMALLY OPEN
IC	MULTI-CONDUCTOR CABLE (" INDICATES NUMBER OF CONDUCTORS)	NUMBER	NUMBER
CB	CIRCUIT BREAKER	NTS	NOT TO SCALE
CC	CONTROL CABINET	NYSDOT	NEW YORK STATE DEPARTMENT OF TRANSPORTATION
CCW	COUNTER-CLOCKWISE	NYPA	NEW YORK POWER AUTHORITY
CE	CABEZAS ENGINEERING	NYSCC	NEW YORK STATE CANALS CORPORATION
CKT	CIRCUIT	O&M	OPERATIONS AND MAINTENANCE
CNTL	CONTROL	OC	OVER-CURRENT PROTECTION
CTP	CONDENSATE TRANSFER PUMP	OL	OVERLOAD
CTS	CURRENT TRANSFORMERS	OPER	OPERATING
CU	COPPER	OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
DS	DISCONNECT SWITCH	POLE	POLE
E-CON	E-CONTRACT	PB	PUSHBUTTON, PULLBOX
EMH	ELECTRIC MANHOLE, # ASSIGNED IDENTIFIER	PFR	PHASE FAILURE RELAY
EUH	ELECTRIC UNIT HEATER	PH	PHASE
EWI	ELECTRIC WATER HEATER	POS	POSITION
FLC	FULL LOAD CURRENT	PPE	PERSONAL PROTECTIVE EQUIPMENT
FO	FUEL OIL	PSP	POUNDS PER SQUARE FOOT
FOP	FUEL OIL PUMP	PVC	POLYVINYL CHLORIDE
FVNR	FULL VOLTAGE NON-REVERSING	PWR	POWER
FVR	FULL VOLTAGE REVERSING	RECPT	RECEPTACLE
G	GREEN, GROUND	RGS	RIGID GALVANIZED STEEL CONDUIT
GFCI	GROUND FAULT CIRCUIT INTERRUPTER	SCH	SCHEDULE
GND	GROUND	SMH	SIGNAL MANHOLE, # ASSIGNED IDENTIFIER
H-CON	H-CONTRACT	SPD	SURGE PROTECTIVE DEVICE
HCS	HANDICAPPED DOOR CONTROL STATION	SW	METAL ENCLOSED PRIMARY SWITCH
HCO	HANDICAPPED DOOR OPERATOR	TOP	TELECOMMUNICATIONS PANEL
HP	HORSE POWER	TP	TELEPHONE PULLBOX
HYF	HYDRAULIC	TYP	TYPICAL
HZ	HERTZ	UNO	UNLESS NOTED OTHERWISE
IN	INCHES	US	UNITED STATES
K	KEY	USGS	UNITED STATES GEOLOGICAL SURVEY
KA	KILOAMPS	V	VOLTS
KAIC	KILOAMPS INTERRUPTING CAPACITY	VIF	VERIFY IN FIELD
KS	THOUSANDS OF POUNDS PER SQUARE INCH	W	WIRE / WATT
L	LINE	XFMR	TRANSFORMER
LB/FT	POUNDS PER FOOT	WYE	WYE

WORK SEQUENCING NOTES:	
1)	PRIOR TO START OF ANY WORK, THOROUGHLY COORDINATE ALL ASPECTS OF PROJECT WORK SEQUENCING WITH DIRECTOR'S REPRESENTATIVE AND C- AND H-CONTRACT.
2)	THE FACILITY IS TO REMAIN FULLY FUNCTIONAL AT ALL TIMES DURING PROJECT. THE FACILITY IS TO REMAIN CONTINUOUSLY, FULLY POWERED, PROVIDE, OPERATE, AND MAINTAIN PORTABLE 300KVA, 480/277, 3 PHASE, 4 WIRE, FUEL OIL FIRED GENERATOR INCLUSIVE OF FUEL AND MAINTENANCE. FOR BIDDING PURPOSES, ASSUME FOR A MAXIMUM OF 60 DAYS OF CONTINUOUS OPERATION, PROVIDE TEMPORARY EQUIPMENT AND ASSOCIATED POWER CIRCUITRY CONNECTIONS TO MAINTAIN OPERATION OF FACILITY. UPON COMPLETION OF PERMANENT INSTALLATIONS, REMOVE TEMPORARY EQUIPMENT, CIRCUITRY, CONNECTIONS, AND ALL ABANDONED EQUIPMENT, CIRCUITRY, AND COMPONENTS SCHEDULED FOR REMOVAL.
3)	TEMPORARY HVAC EQUIPMENT BY H-CONTRACT. PROVIDE TEMPORARY HVAC EQUIPMENT POWER CIRCUITRY AND CONNECTIONS TO HVAC EQUIPMENT PER PROJECT SEQUENCE DISCUSSIONS, TEST AND ADJUST FOR PROPER OPERATION. UPON COMPLETION OF PERMANENT INSTALLATIONS, REMOVE TEMPORARY CIRCUITRY AND CONNECTIONS.
4)	INTERRUPTIONS OF POWER SERVICE TO THE FACILITY ARE TO BE KEPT AT THE MINIMUM POSSIBLE. ANY AND ALL INTERRUPTIONS ARE TO BE SCHEDULED WITH THE DIRECTOR'S REPRESENTATIVE A MINIMUM OF FOURTEEN DYS IN ADVANCE. NO POWER INTERRUPTIONS SHALL OCCUR WITHOUT THE DIRECTOR'S REPRESENTATIVES WRITTEN AUTHORIZATION.

Office of General Services

CONSULTANT:

CERTIFICATE OF AUTHORIZATION #: 0022724

CABEZAS
ENGINEERING, PLLC

TO THE BEST OF THE ENGINEER'S KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND/OR SPECIFICATION ARE IN COMPLIANCE WITH THE 2025 ENERGY CONSTRUCTION CODE OF NEW YORK STATE.

TO THE BEST OF THE ENGINEER'S KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND/OR SPECIFICATION ARE IN COMPLIANCE WITH THE 2025 BUILDING CODE OF NEW YORK STATE.

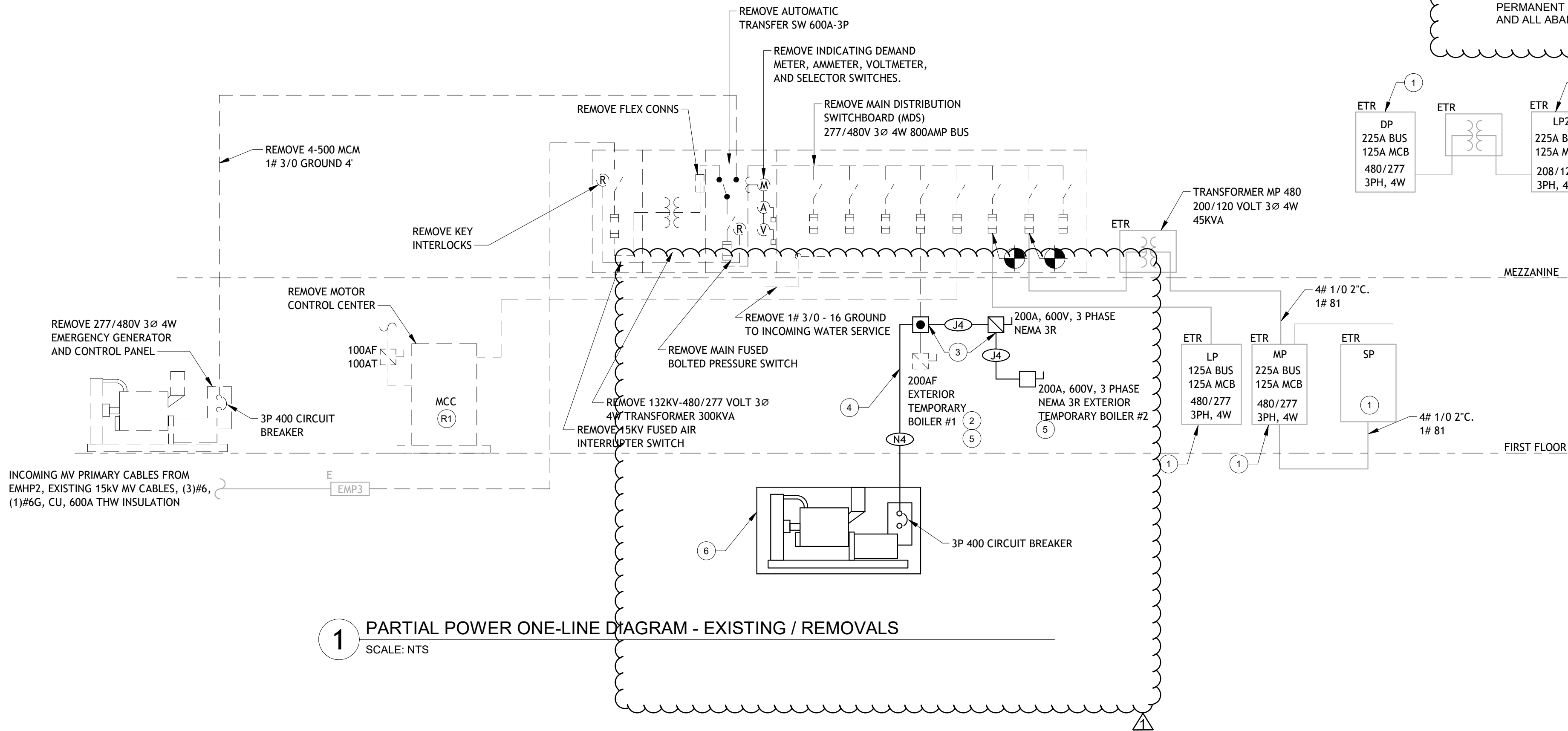
WARNING:

THE ALTERATION OF THIS MATERIAL IN ANY WAY, UNLESS DONE UNDER THE DIRECTION OF A COMPARABLE PROFESSIONAL, I.E. ARCHITECT FOR AN ARCHITECT, ENGINEER FOR AN ENGINEER OR LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT, IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND/OR REGULATIONS AND IS A CLASS "A" MISDEMEANOR.

REGISTRATION EXPIRES: 08/31/2029

ELECTRICAL	
TITLE:	REFURBISH BOILER PLANT AND REPLACE FEEDWATER SYSTEM
LOCATION:	WALLKILL CORRECTIONAL FACILITY 50 MC KENDRICK RD WALLKILL, NY
CLIENT:	DEPARTMENT OF CORRECTIONS AND COMMUNITY SUPERVISION

1	9/26/2026	BID ADDENDUM 3
	05/20/2026	BID DOCUMENT
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	M3215 - E	
DESIGNED BY:	JLE	
DRAWN BY:	HNC	
FIELD CHECK:		
APPROVED:	HJC	
SHEET TITLE:		
ABBREVIATIONS, DETAILS, GENERAL NOTES, AND SYMBOLS LEGEND		
DRAWING NUMBER		
E-001		
SHEET 35 OF 49		



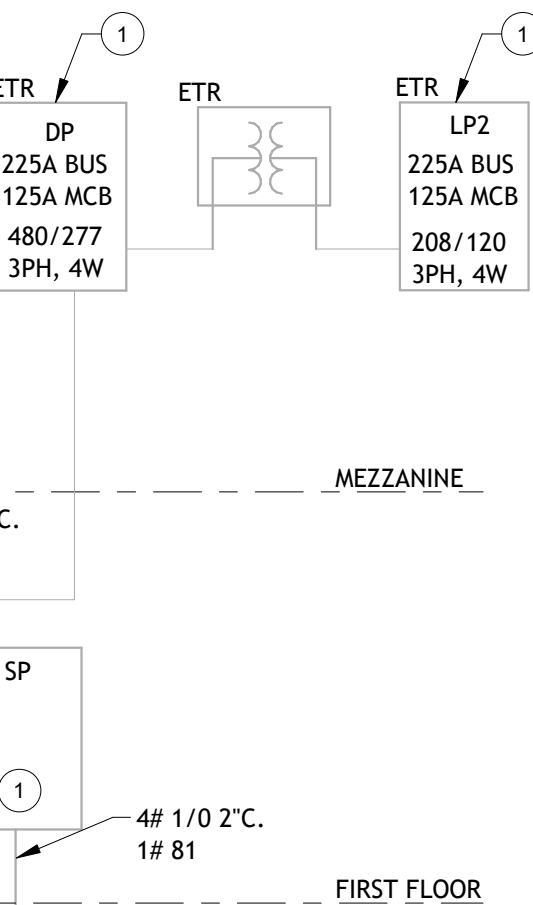
1 PARTIAL POWER ONE-LINE DIAGRAM - EXISTING / REMOVALS
SCALE: NTS

GENERAL NOTES, THIS SHEET:

A. REFER TO DRAWING E-001 FOR APPLICABLE ABBREVIATIONS, GENERAL NOTES, AND SYMBOLS LEGEND

KEYED NOTES, THIS SHEET:

- 1 PRIOR TO START OF WORK, TRACE AND IDENTIFY ALL LOADS SERVED FROM PANEL. IDENTIFY UNUSED LOADS AS SPARE. RECORD FINDINGS FOR FUTURE WORK. PROVIDE RECORD OF EXISTING CONDITIONS SUBMITTAL OF TO ENGINEER.
- 2 EXISTING TEMPORARY STEAM BOILER #1 IS FED FROM MDP. MAINTAIN FULL AND PROPER OPERATION OF TEMP STEAM BOILER #1 FOR DURATION OF PROJECT. DURING THE INSTALLATION OF THE NEW ELECTRIC SERVICE SEQUENCE, TEMPORARY STEAM BOILER #1 TO BE SWITCHED OVER, SO TO BE FED FROM STAND-BY GENERATOR POWER. UPON COMPLETION OF THE NEW ELECTRIC SERVICE SEQUENCE, TEMPORARY STEAM BOILER #1 IS TO BE SWITCHED OVER AND RE-FED FROM THE NEW MDP.
- 3 EXISTING TEMPORARY STEAM BOILER #1 IS FED FROM MDP. MAINTAIN FULL AND PROPER OPERATION OF TEMP STEAM BOILER #1 FOR DURATION OF PROJECT. DURING THE INSTALLATION OF THE NEW ELECTRIC SERVICE SEQUENCE, TEMPORARY STEAM BOILER #1 TO BE SWITCHED OVER, SO TO BE FED FROM STAND-BY GENERATOR POWER. UPON COMPLETION OF THE NEW ELECTRIC SERVICE SEQUENCE, TEMPORARY STEAM BOILER #1 IS TO BE SWITCHED OVER AND RE-FED FROM THE NEW MDP.
- 4 INTERRUPT AND TAP CIRCUITRY SERVING TEMPORARY STEAM BOILER #1 FROM EXISTING MDP TO FEED NEW TEMPORARY BOILER #2. PROVIDE FUSED DISCONNECT WITHIN TEN FEET OF TAP. PROVIDE CIRCUITRY FOR CONNECTION TO EXTERIOR TEMPORARY STEAM BOILER #2 AND CONNECT. MAINTAIN FULL AND PROPER OPERATION OF TEMP STEAM BOILER #2 FOR DURATION OF PROJECT. DURING THE INSTALLATION OF THE NEW ELECTRIC SERVICE SEQUENCE, TEMPORARY STEAM BOILER #2 TO BE SWITCHED OVER, SO TO BE FED FROM STAND-BY GENERATOR POWER. UPON COMPLETION OF THE NEW ELECTRIC SERVICE SEQUENCE, TEMPORARY STEAM BOILER #2 IS TO BE SWITCHED OVER AND RE-FED FROM THE NEW MDP. NOTE: THE TEMPORARY STEAM BOILERS WILL OPERATE IN A LEAD / LAG CONFIGURATION. BOTH TEMPORARY STEAM BOILERS WILL NEVER OPERATE SIMULTANEOUSLY. COORDINATE ALL WORK AND SEQUENCING WITH DIRECTOR'S REPRESENTATIVE.
- 5 PRIOR TO PROJECT SUBSTANTIAL COMPLETION, DISCONNECT AND REMOVE ALL TEMPORARY AND/OR ABANDONED ELECTRICAL EQUIPMENT AND APPURTENANCES, IN THEIR ENTIRETY.
- 6 THE FACILITY IS TO REMAIN FULLY FUNCTIONAL AT ALL TIMES DURING PROJECT. THE FACILITY IS TO REMAIN CONTINUOUSLY, FULLY POWERED, PROVIDE, OPERATE, AND MAINTAIN PORTABLE 300KVA, 480/277, 3 PHASE, 4 WIRE, FUEL OIL FIRED GENERATOR INCLUSIVE OF FUEL AND MAINTENANCE, FOR BIDDING PURPOSES, ASSUME FOR A MAXIMUM OF 60 DAYS OF CONTINUOUS OPERATION. PROVIDE TEMPORARY EQUIPMENT AND ASSOCIATED POWER CIRCUITRY CONNECTIONS TO MAINTAIN OPERATION OF FACILITY. UPON COMPLETION OF PERMANENT INSTALLATIONS, REMOVE TEMPORARY EQUIPMENT, CIRCUITRY, CONNECTIONS, AND ALL ABANDONED EQUIPMENT, CIRCUITRY, AND COMPONENTS SCHEDULED FOR REMOVAL.



GENERAL DIAGRAM NOTES:

- SET ADJUST SETTINGS IN ACCORDANCE WITH SECTION 26057 "OVER CURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY" AND SECTION 260573.16" COORDINATION STUDIES.
- PROVIDE THERMAL MAGNETIC TRIP FOR BREAKERS HAVING TRIP RATINGS UP TO 249AMPS. SQUARE D (OR EQUAL BY SIEMENS, EATON), UNLESS NOTED OTHERWISE.
- PROVIDE 100% RATED BREAKERS FOR FRAME SIZES OF 250 AMPS AND ABOVE. SQUARE D (OR EQUAL BY SIEMENS, EATON)
- PROVIDE FIELD ADJUSTABLE LSI ELECTRONIC TRIP UNITS ON BREAKERS RATED 250A UP TO 800A. SQUARE D (OR EQUAL BY SIEMENS, EATON)
- PROVIDE FIELD ADJUSTABLE LSI ELECTRONIC TRIP UNITS ON BREAKERS RATED 800A AND LARGER. SQUARE D (OR EQUAL BY SIEMENS, EATON)
- PROVIDE FIELD ADJUSTABLE LSI ELECTRONIC TRIP UNITS ON BREAKERS RATED 800A AND LARGER. SQUARE D MICROLOGIC 6.0 (OR EQUAL BY SIEMENS, EATON)
- FIELD CONFIGURE ADJUSTABLE ELECTRONIC TRIP SETTINGS BASED ON POWER COORDINATION STUDY AND APPROVED EQUIPMENT SUBMITTALS.
- PROVIDE PERMANENT EQUIPMENT LABELS MATCHING NOMANCLATURE INDICATED IN ACCORDANCE WITH IDENTIFICATION FOR ELECTRICAL SYSTEMS SPECIFICATIONS.
- PROVIDE ARC FLASH IDENTIFICATION LABELS ON ALL DISTRIBUTION EQUIPMENT IN ACCORDANCE WITH IDENTIFICATION FOR ELECTRICAL SYSTEMS SPECIFICATIONS.
- COORDINATE ALL WORK ON SITE WITH DIRECTOR'S REPRESENTATIVE AND LOCAL UTILITY REPRESENTATIVE.
- SEE PANEL SCHEDULES AND LAYOUTS FOR EQUIPMENT INTERRUPT AIC RATINGS.

CONSULTANT:

CERTIFICATE OF AUTHORIZATION #: 0022724

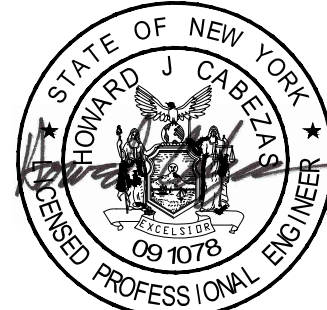


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WARNING:

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REGISTRATION EXPIRES: 08/31/2029

CONTRACT:

ELECTRICAL

TITLE: REFURBISH BOILER PLANT AND REPLACE FEEDWATER SYSTEM

LOCATION: WALLKILL CORRECTIONAL FACILITY
50 MC KENDRICK RD
WALLKILL, NY

CLIENT: DEPARTMENT OF CORRECTIONS AND COMMUNITY SUPERVISION

1	9/26/2026	BID ADDENDUM 3
	05/20/2026	BID DOCUMENT
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	M3215 - E	
DESIGNED BY:	JLE	
DRAWN BY:	HNC	
FIELD CHECK:		
APPROVED:	HJC	

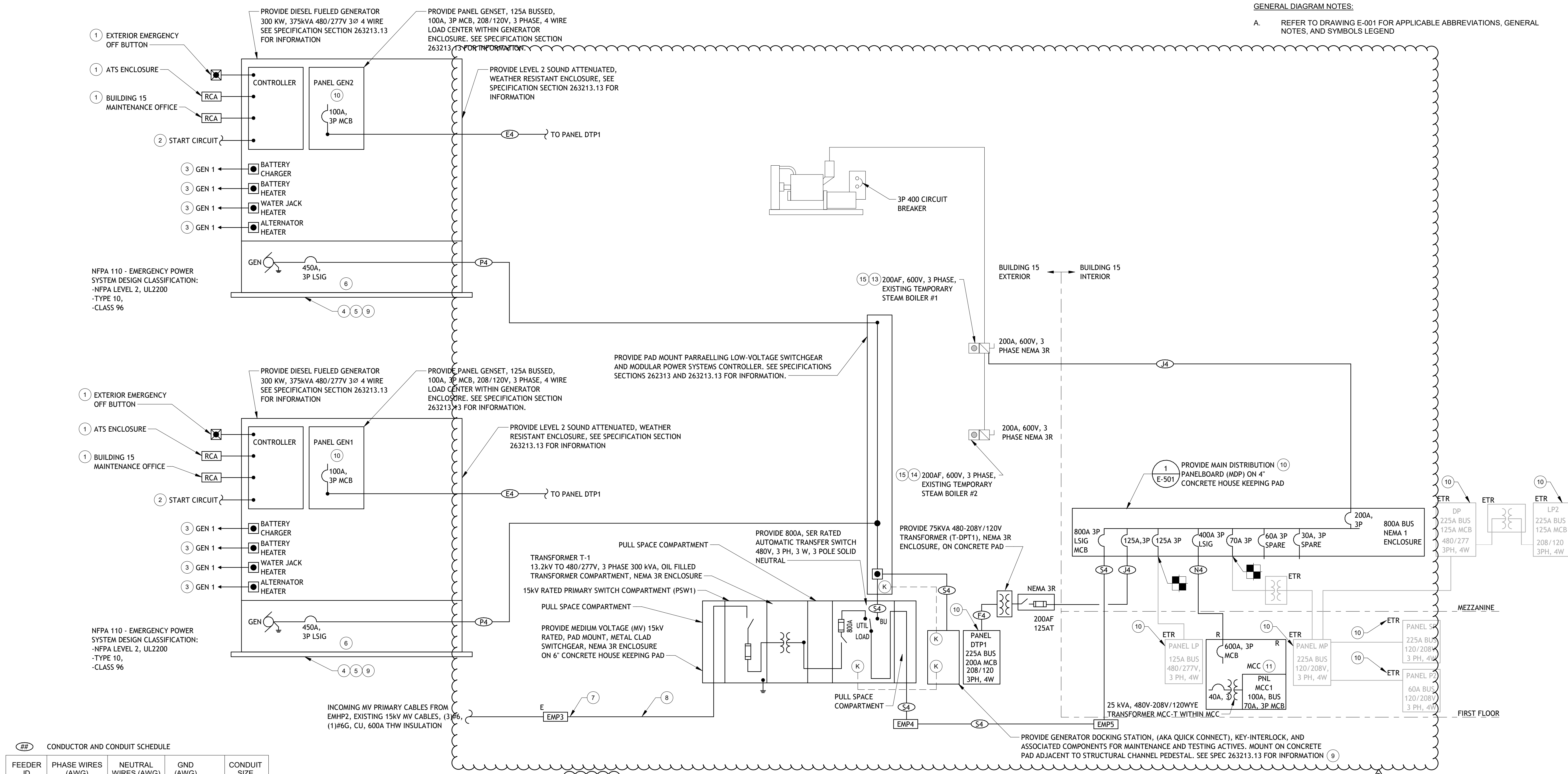
ONE LINE RISER DIAGRAMS

DRAWING NUMBER

E-301

GENERAL DIAGRAM NOTES:

- A. REFER TO DRAWING E-001 FOR APPLICABLE ABBREVIATIONS, GENERAL NOTES, AND SYMBOLS LEGEND



CONDUCTOR AND CONDUIT SCHEDULE

FEEDER ID	PHASE WIRES (AWG)	NEUTRAL WIRES (AWG)	GND (AWG)	CONDUIT SIZE
A3	(3)#10		#10	3/4"
A4	(3)#10	(1)#10	#10	3/4"
B3	(3)#8	(1)#8	#10	3/4"
B4	(3)#8		#10	1"
C3	(3)#6	#8	#8	1"
C4	(3)#6	(1)#6	#8	1-1/4"
D3	(3)#4		#8	1"
D4	(3)#4	(1)#4	#8	1-1/4"
E3	(3)#2		#8	1-1/2"
E4	(3)#2	(1)#2	#8	1-1/2"
E5	(3)#2	(2)#2	#8	1-1/2"
F3	(3)#1/0		#6	1-1/2"
F4	(3)#1/0	(1)#1/0	#6	2"
F5	(3)#1/0	(2)1/0	#6	2"
G3	(3)#2/0		#4	2"
G4	(3)#2/0	(1)#2/0	#4	2"
G5	(3)#2/0	(2)#2/0	#4	2"
H3	(3)#3/0		#4	2"
H4	(3)#3/0	(1)#3/0	#4	2"
H5	(3)#3/0	(2)#3/0	#4	2-1/2"
J3	(3)#4/0		#2	2"
J4	(3)#4/0	(1)#4/0	#2	2-1/2"
J5	(3)#4/0	(2)#4/0	#2	2-1/2"
K3	(3)250 KCMIL		#2	2-1/2"
K4	(3)250 KCMIL	(1)250 KCMIL	#2	2-1/2"
K5	(3)250 KCMIL	(2)250 KCMIL	#2	2-1/2"
L3	(3)350 KCMIL		#1/0	2-1/2"
L4	(3)350 KCMIL	(1)350 KCMIL	#1/0	2-1/2"
L5	(3)350 KCMIL	(2)350 KCMIL	#1/0	3"
M3	(3)500 KCMIL		#1/0	3"
M4	(3)500 KCMIL	(2)500 KCMIL	#1/0	3-1/2"
M5	(3)500 KCMIL	(4)500 KCMIL	#1/0	4"
N3	(6)#3/0		(2)#1/0	(2) 2"
N4	(6)#3/0	(2)#3/0	(2)#1/0	(2) 2"
N5	(6)#3/0	(4)#3/0	(2)#1/0	(2) 2-1/2"
P3	(6)250 KCMIL		(2)#1/0	(2) 2-1/2"
P4	(6)250 KCMIL	(2)250 KCMIL	(2)#1/0	(2) 2-1/2"
P5	(6)250 KCMIL	(4)250 KCMIL	(2)#1/0	(2) 2-1/2"
Q3	(6)350 KCMIL		(2)#2/0	(2) 2-1/2"
Q4	(6)350 KCMIL	(2)350 KCMIL	(2)#2/0	(2) 3"
Q5	(6)350 KCMIL	(4)350 KCMIL	(2)#2/0	(2) 3"
R3	(6)500 KCMIL		(2)#3/0	(2) 3"
R4	(6)500 KCMIL	(2)500 KCMIL	(2)#3/0	(2) 3-1/2"
R5	(6)500 KCMIL	(4)500 KCMIL	(2)#3/0	(2) 4"
S3	(9)350 KCMIL		(3)#3/0	(3) 3-1/2"
S4	(9)350 KCMIL	(3)350 KCMIL	(3)#3/0	(3) 3"
S5	(9)350 KCMIL	(6)350 KCMIL	(3)#3/0	(3) 3"

PARTIAL POWER ONE-LINE DIAGRAM - POWER INSTALLATIONS

SCALE: NTS

KEYED DIAGRAM NOTES:

- PROVIDE MANUFACTURER SPECIFIED CONTROL CIRCUITRY IN 1" CONDUIT AND CONNECT, (1) CAT 6 AND (2) #14 STP. VERIFY WITH APPROVED MANUFACTURER. CONFIRM LOCATIONS WITH DIRECTOR'S REPRESENTATIVE PRIOR TO ROUGH-IN. ALLOW 240 LF TOTAL OF CIRCUITRY FOR BIDDING PURPOSES.
- PROVIDE GENERATOR START CONTROL CIRCUITRY FROM ATS TO GENERATOR CONTROLLER PER MANUFACTURER'S SPECIFICATIONS FOR BIDDING PURPOSES ALLOW FOR (1) #16 AND (2) #14 STP, 1" CONDUIT, VERIFY IN FIELD.
- SEE CONDUCTOR AND CONDUIT SCHEDULE AND SPECIFICATIONS FOR CIRCUITRY REQUIREMENTS.
- PROVIDE GENERATOR PAD, COORDINATE INSTALLATION OF EQUIPMENT PAD WITH ALL TRADES AND DIRECTOR'S REPRESENTATIVE PRIOR TO START OF WORK. COORDINATE LAYOUT AND PLACEMENT OF UTILITY STUB-UPS WITH APPROVED SUBMITTAL PRIOR TO EXCAVATION FOR GENERATOR.
- PROVIDE 6 INCH CONCRETE HOUSE-KEEPING PAD. COORDINATE INSTALLATION WITH DIRECTOR'S REPRESENTATIVE AND ALL TRADES.
- GROUND GENERATOR AS NON-SEPARATELY DERIVED SYSTEM IN ACCORDANCE WITH NEC ARTICLE 250.
- INTERRUPT EXISTING 13.2kV MV PRIMARY CONDUCTORS WITHIN MV ELECTRIC MANHOLE (EMHP3). MODIFY/EXTEND EXISTING CONDUCTORS TO EXTERIOR PAD MOUNT 15KV LOAD INTERRUPTER PRIMARY SWITCH 1 (PSW1). SEE ONE-LINE DIAGRAM. COORDINATE WITH DIRECTOR'S REPRESENTATIVE AND ALL TRADES.
- EXTEND EXISTING 15KV MV CABLES, (3)#6, (1)#6G, CU, 600V THW INSULATION TO MATCH EXISTING.
- PROVIDE MANUFACTURER'S FURNISHED MOUNTING RACK / BRACKETS / DUNNAGE, SIZED PER APPROVED EQUIPMENT SUBMITTALS.
- UPON COMPLETION OF WORK, PROVIDE TYPE WRITTEN DIRECTORY OF ALL LOADS SERVED FROM PANEL. IDENTIFY UNUSED LOADS AS SPARE, AND SWITCHED TO THE OFF POSITION.
- PROVIDE PERMANENT IDENTIFICATION LABEL ACCURATELY IDENTIFYING ALL LOADS SERVED FROM MCC. IDENTIFY UNUSED BUCKETS AS SPARE, AND SWITCHED TO THE OFF POSITION.
- PROVIDE PERMANENT IDENTIFICATION LABEL ACCURATELY IDENTIFYING ALL LOADS SERVED FROM MDP. IDENTIFY UNUSED BREAKERS AS SPARE, AND SWITCHED TO THE OFF POSITION.
- UPON COMPLETION OF THE NEW ELECTRIC SERVICE SEQUENCE, MODIFY / EXTEND POWER CIRCUITRY SERVING TEMPORARY STEAM BOILER #2 SO TO BE RE-FEED FROM THE NEW MDP. TEMPORARY BOILER #2 IS TO REMAIN FULLY OPERATIONAL FOR DURATION OF PROJECT, EXCLUDING LIMITED SWITCH-OVERS. COORDINATE IN FIELD WITH DIRECTOR'S REPRESENTATIVE.
- UPON COMPLETION OF THE NEW ELECTRIC SERVICE SEQUENCE, MODIFY / EXTEND POWER CIRCUITRY SERVING TEMPORARY STEAM BOILER #1 SO TO BE RE-FEED FROM THE NEW MDP. TEMPORARY BOILER #1 IS TO REMAIN FULLY OPERATIONAL FOR DURATION OF PROJECT, EXCLUDING LIMITED SWITCH-OVERS. COORDINATE IN FIELD WITH DIRECTOR'S REPRESENTATIVE.
- TEMPORARY BOILER REMOVAL BY H-CONTRACT. E-CONTRACT TO DISCONNECT AND REMOVE ASSOCIATED POWER CIRCUITRY AND APPURTENANCES COMPLETE TO SOURCE. IDENTIFY ABANDONED POWER SOURCE AS "SPARE"

GENERAL DIAGRAM NOTES:

- SET ADJUST SETTINGS IN ACCORDANCE WITH SECTION 26057 "OVER CURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY" AND SECTION 260573.16" COORDINATION STUDIES.
- PROVIDE THERMAL MAGNETIC TRIP FOR BREAKERS HAVING TRIP RATINGS UP TO 249AMPS. SQUARE D (OR EQUAL BY SIEMENS, EATON), UNLESS NOTED OTHERWISE.
- PROVIDE 100% RATED BREAKERS FOR FRAME SIZES OF 250 AMPS AND ABOVE. SQUARE D (OR EQUAL BY SIEMENS, EATON)
- PROVIDE FIELD ADJUSTABLE LSI ELECTRONIC TRIP UNITS ON BREAKERS RATED 250A UP TO 800A. SQUARE D (OR EQUAL BY SIEMENS, EATON)
- PROVIDE FIELD ADJUSTABLE LSI ELECTRONIC TRIP UNITS ON BREAKERS RATED 800A AND LARGER. SQUARE D (OR EQUAL BY SIEMENS, EATON)
- PROVIDE FIELD ADJUSTABLE LSI ELECTRONIC TRIP UNITS ON BREAKERS RATED 800A AND LARGER. SQUARE D MICROLOGIC 6.0 (OR EQUAL BY SIEMENS, EATON)
- FIELD CONFIGURE ADJUSTABLE ELECTRONIC TRIP SETTINGS BASED ON POWER COORDINATION STUDY AND APPROVED EQUIPMENT SUBMITTALS.
- PROVIDE PERMANENT EQUIPMENT LABELS MATCHING NOMENCLATURE INDICATED IN ACCORDANCE WITH IDENTIFICATION FOR ELECTRICAL SYSTEMS SPECIFICATIONS.
- PROVIDE ARC FLASH IDENTIFICATION LABELS ON ALL DISTRIBUTION EQUIPMENT IN ACCORDANCE WITH IDENTIFICATION FOR ELECTRICAL SYSTEMS SPECIFICATIONS.
- COORDINATE ALL WORK ON SITE WITH DIRECTOR'S REPRESENTATIVE AND LOCAL UTILITY REPRESENTATIVE.
- SEE PANEL SCHEDULES AND LAYOUTS FOR EQUIPMENT INTERRUPT AIC RATINGS.
- PROVIDE POWER SYSTEM COORDINATION STUDY ASSOCIATED WITH WORK PERFORMED THIS PROJECT. SEE SPECIFICATIONS SECTION 260573 FOR INFORMATION AND ADDITIONAL REQUIREMENTS.

CONSULTANT:

CERTIFICATE OF AUTHORIZATION #: 0022724



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REGISTRATION EXPIRES: 08/31/2029

CONTRACT:

ELECTRICAL

TITLE:
**REFURBISH BOILER PLANT AND
REPLACE FEEDWATER SYSTEM**

LOCATION:
**WALLKILL CORRECTIONAL FACILITY
50 MC KENDRICK RD
WALLKILL, NY**

CLIENT:
**DEPARTMENT OF CORRECTIONS AND
COMMUNITY SUPERVISION**

2	9/26/2026	BID ADDENDUM 3
1	9/09/2026	BID ADDENDUM 1

	05/20/2026	BID DOCUMENT
MARK	DATE	DESCRIPTION
PROJECT NUMBER:		M3215 - E
DESIGNED BY:		JLE
DRAWN BY:		HNC
FIELD CHECK:		
APPROVED:		HJC

SHEET TITLE:

ONE LINE RISER DIAGRAMS

DRAWING NUMBER

E-302

SHEET 45 OF 49

GENERAL NOTES:

A. SEE SHEET E-001 FOR BASIC ELECTRICAL REQUIREMENTS, SCHEDULES, SYMBOLS LEGEND, AND ABBREVIATIONS

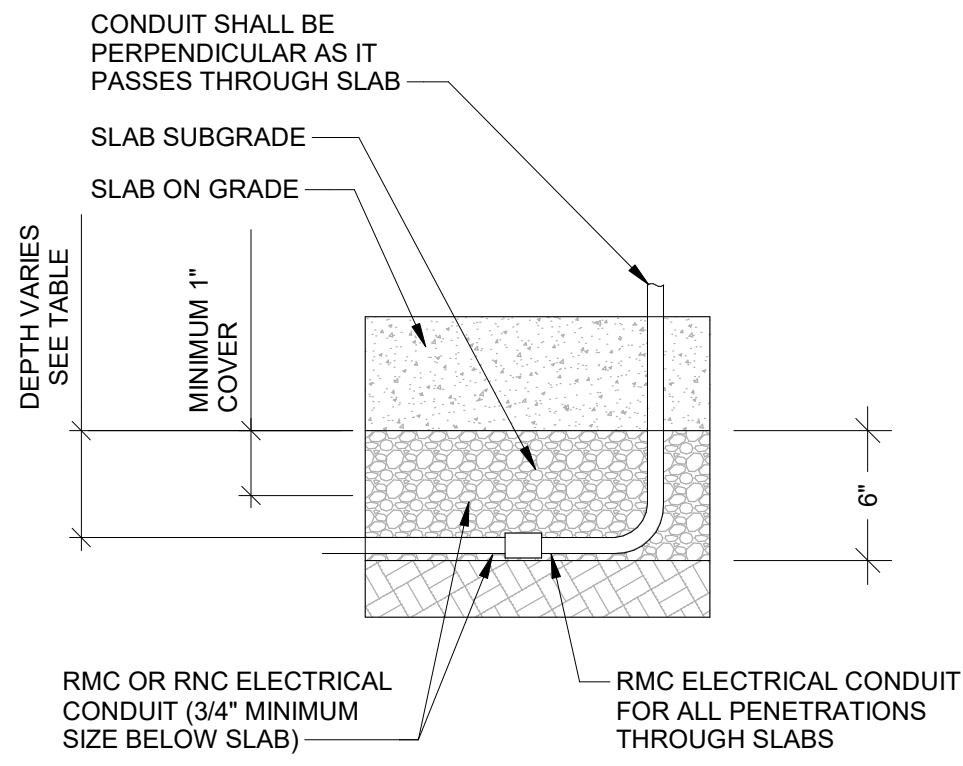
CONDUIT INSTALLATION NOTES:

- CONDUIT IN STRUCTURES SHALL HAVE EXPANSION FITTINGS AT STRUCTURE EXPANSION JOINTS. ALL STRAIGHT RUNS OF RMC CONDUIT EXPOSED ON STRUCTURES SUCH AS BRIDGES SHALL HAVE EXPANSION JOINTS INSTALLED AT MAXIMUM INTERVALS OF 150 FEET. EXPANSION JOINTS SHALL BE INSTALLED SO THEY ALLOW FOR MOVEMENT OF THE CONDUIT. INSTALLATION OF THE JOINT IN SUCH A MANNER THAT WILL NOT ALLOW FOR MOVEMENT SHALL BE REPAIRED AT NO EXPENSE TO THE STATE. THE METHOD OF DETERMINING THE FINAL SETTING LENGTH OF THE EXPANSION JOINT SHALL BE PROVIDED TO THE ENGINEER UPON REQUEST.
- CONDUIT SUPPORTS SHALL BE SPACED AT MAXIMUM INTERVALS OF 5 FEET. CONDUIT SPACERS SHALL BE USED WITH METAL CONDUIT PLACED ON SURFACES OF CONCRETE STRUCTURES (SEE CONDUIT MOUNTING OPTIONS).
- OPEN ENDS OF ALL CONDUIT AND RACEWAYS SHALL BE FITTED WITH TEMPORARY CAPS OR PLUGS TO PREVENT ENTRY OF DIRT, DEBRIS AND RODENTS DURING CONSTRUCTION. THE TEMPORARY CAP MAY BE CONSTRUCTED OF DUCT TAPE, BUT IN ALL CASES SHALL BE TIGHTLY FIXED TO THE CONDUIT AND SHALL BE DURABLE. THE CONTRACTOR SHALL CLEAN OUT THE CONDUIT AND PROVE IT CLEAR IN ACCORDANCE WITH STANDARD SPECIFICATIONS PRIOR TO INSTALLING ANY CONDUCTORS.
- CONDUIT ENTRY INTO THE TOP OF ENCLOSURES SUCH AS SAFETY SWITCHES, METER CANS, SERVICE ENCLOSURES, AUXILIARY ENCLOSURES AND JUNCTION BOXES SHALL BE MADE WEATHERPROOF USING CONDUIT SEALING HUBS, OR THREADED BOSSES.
- A BONDING JUMPER SHALL BE INSTALLED FROM EACH GROUNDING BUSHING TO THE NEAREST GROUNDING ROD, GROUNDING LUG, AND/OR EQUIPMENT GROUNDING CONDUCTOR. ALL JUMPERS SHALL BE THE SAME SIZE AS EQUIPMENT GROUNDING CONDUCTOR. AT ELECTRICAL SERVICES, GROUNDING ELECTRODE CONDUCTOR SHALL BE A SOLID COPPER #6 AWG.
- METAL JUNCTION BOXES SHALL BE BONDED TO THE GROUNDING CONDUCTOR IN ACCORDANCE WITH THE NEC.
- CONDUIT ENDS SHALL BE SEALED WITH HEAT SHRINK BOOTS WITH WATERPROOF SEALANT, URETHANE FOAM, OR BY OTHER METHODS APPROVED BY THE ENGINEER. SEALING SHALL BE DONE AFTER COMPLETION OF ANY REQUIRED. DUCT TAPE SHALL NOT BE USED AS A PERMANENT CONDUIT SEALANT. SILICONE CAULKING SHALL NOT BE USED AS A SEALANT.
- ALL STRUT MOUNTING MATERIAL AND HARDWARE SHALL BE HOT-DIP GALVANIZED OR SHALL BE STAINLESS STEEL. THE CUT ENDS (CONTENT). ZINC RICH PAINT MAY ONLY BE USED TO TOUCH UP GALVANIZED MATERIAL. THE PAINTING OF NON-GALVANIZED OF STRUT AND NON-GALVANIZED RIGID METAL CONDUIT THREADS SHALL BE COATED WITH A ZINC RICH PAINT (90% OR MORE ZINC MATERIAL WITH A ZINC RICH PAINT SHALL NOT BE CONSIDERED AS AN APPROVED ALTERNATIVE FOR GALVANIZED MATERIALS.
- ALL METAL CONDUIT TERMINATIONS SHALL BE FITTED WITH A GROUNDING TYPE BUSHING.

SIZE	MINIMUM DEPTH
3/4"	3-1/2" BELOW SLAB
1"	4-1/2" BELOW SLAB
1-1/4"	5-1/2" BELOW SLAB
1-1/2"	6-1/2" BELOW SLAB
2"	7-1/2" BELOW SLAB
2-1/2"	9" BELOW SLAB
3"	10-1/4" BELOW SLAB
3-1/2"	12" BELOW SLAB
4"	14" BELOW SLAB

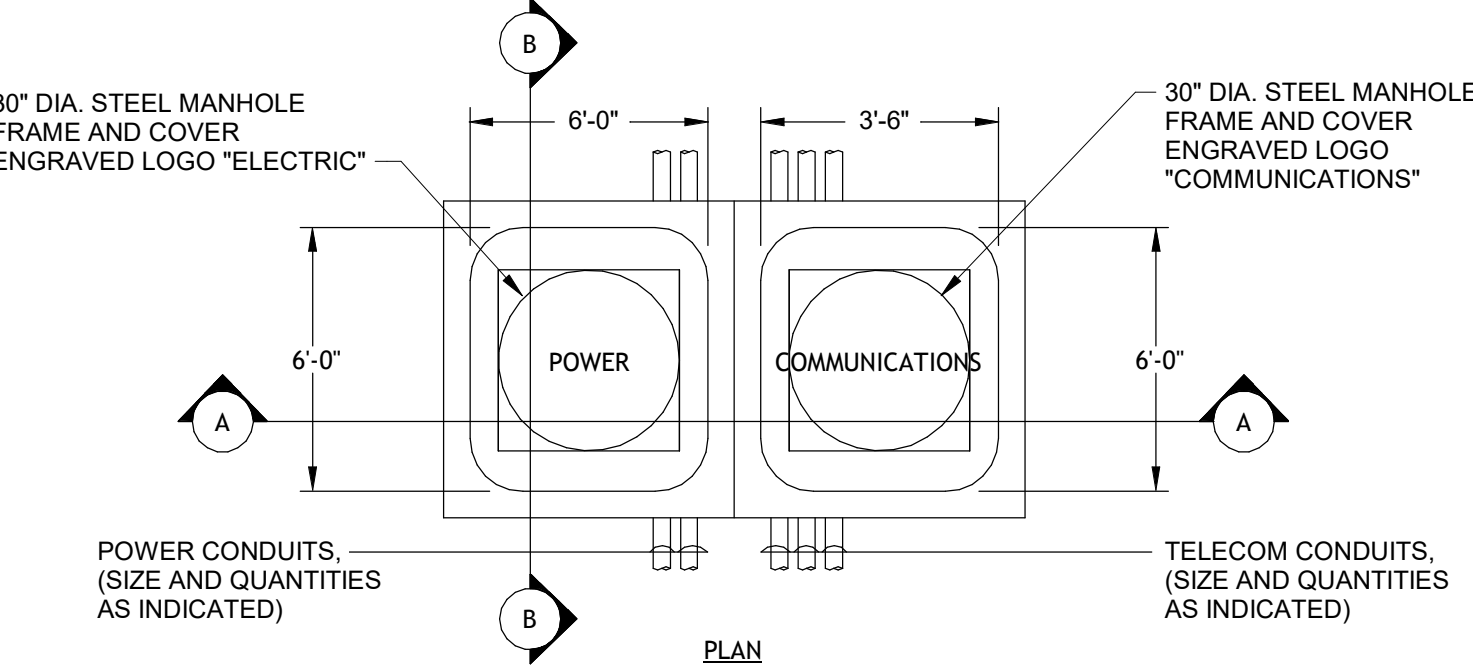
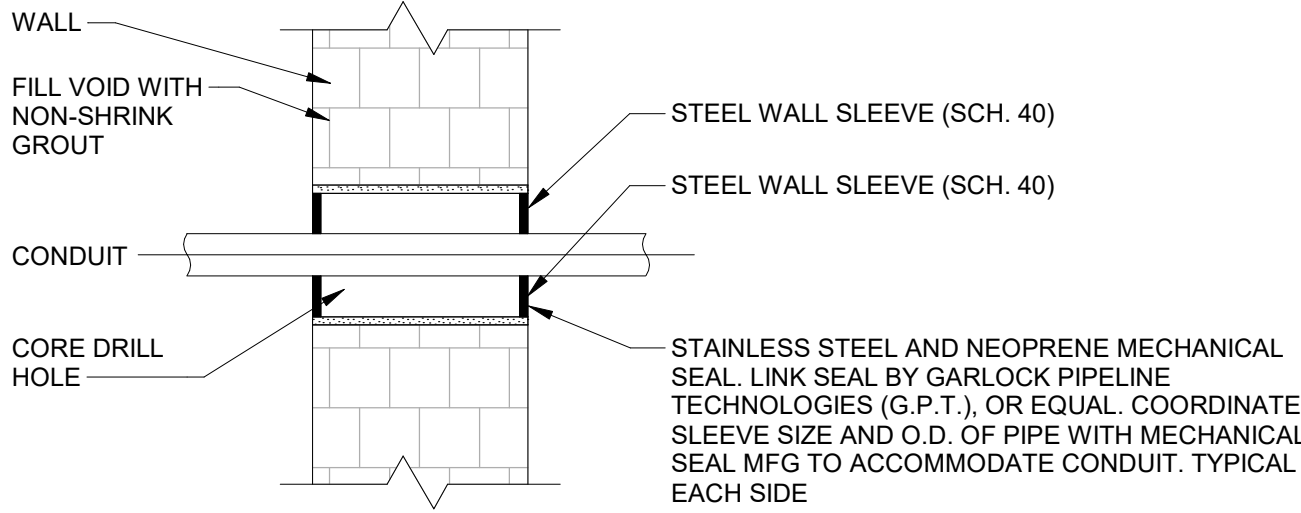
TYPICAL CONDUIT PLACEMENT AT SLAB ON GRADE INSTALLATION DETAIL

SCALE: NTS



TYPICAL BLOCK/BRICK/CAST-IN PLACE EXTERIOR WALL CONDUIT PENETRATION DETAIL

SCALE: NTS



TWO-SECTION MANHOLE DETAIL

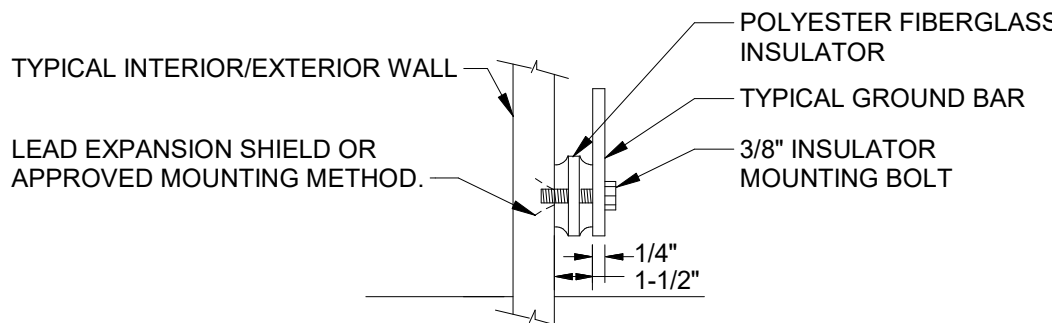
SCALE: NTS

BAR/ROD SIZE	EMBEDMENT DEPTH
#4 OR 1/2"	5"
#5 OR 5/8"	6"
#6 OR 3/4"	7"
#7 OR 7/8"	8"
#8 OR 1"	9"

- COMPLY WITH MANUFACTURERS REQUIREMENTS FOR INSTALLATION.
- ADHESIVE ANCHOR: DRILLED-IN AND CAPSULE ANCHOR SYSTEM CONTAINING POLYVINYL OR URETHANE METHACRYLATE-BASED RESIN AND ACCELERATOR, OR INJECTED POLYMER OR FYBRID MORTAR ADHESIVE. PROVIDE ANCHOR BOLTS AND HARDWARE WITH ZINC-COATED STEEL FOR INTERIOR APPLICATIONS AND STAINLESS STEEL FOR EXTERIOR APPLICATIONS. SELECT ANCHOR BOLTS WITH STRENGTH REQUIRED FOR ANCHOR AND AS TESTED ACCORDING TO ASTM E 488, "TEST METHODS FOR STRENGTH OF ANCHORS IN CONCRETE AND MASONRY ELEMENTS", OR EQUIVALENT INDUSTRY STANDARD.

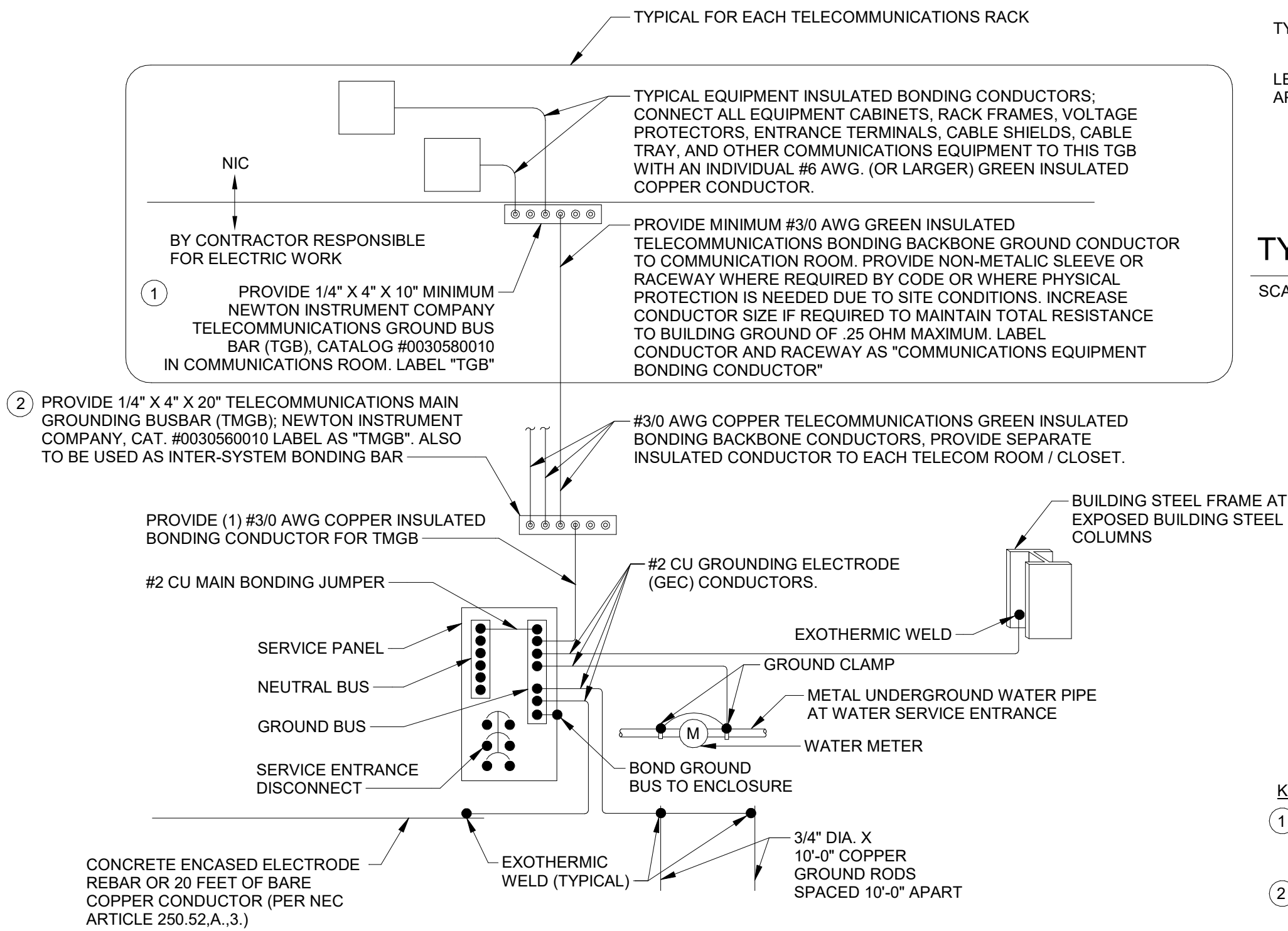
TYPICAL CHEMICAL ANCHORS

SCALE: NTS



TYPICAL GROUNDING BUS BAR MOUNTING SECTION

SCALE: NTS

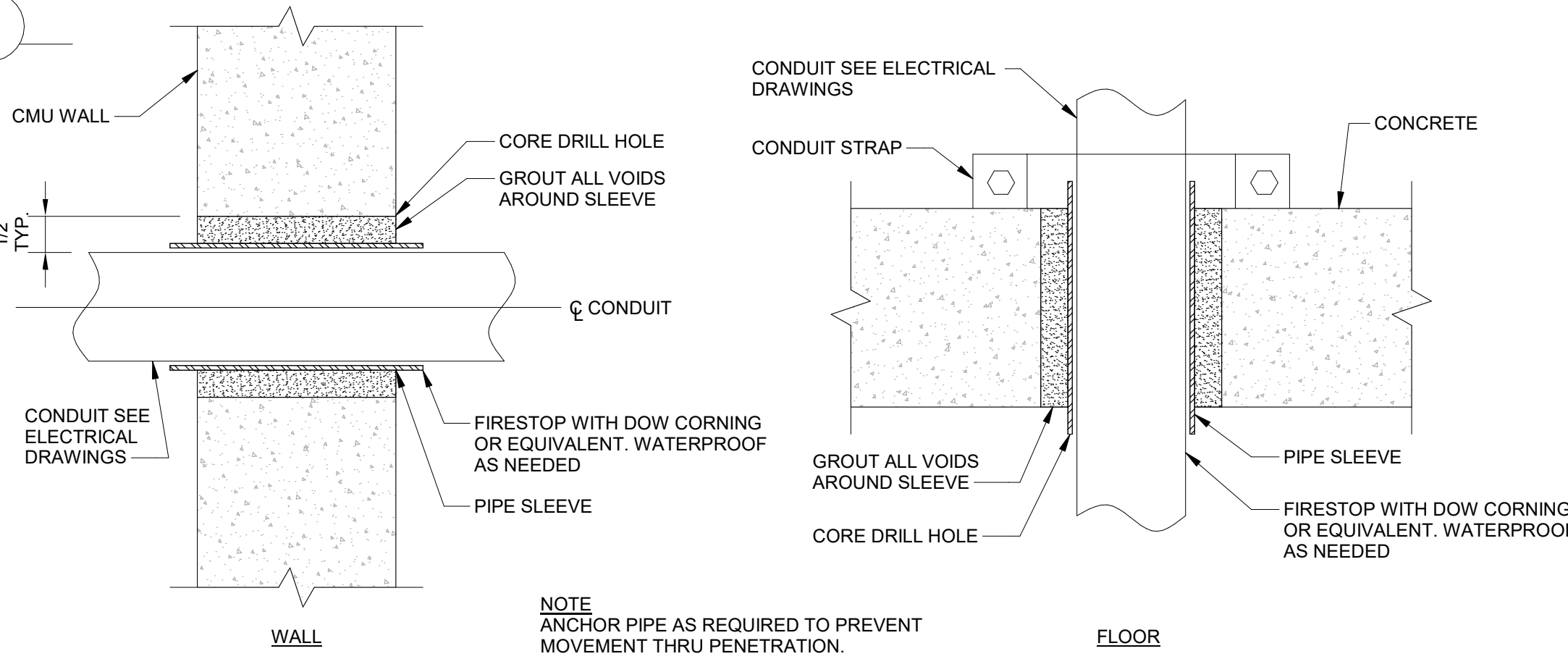
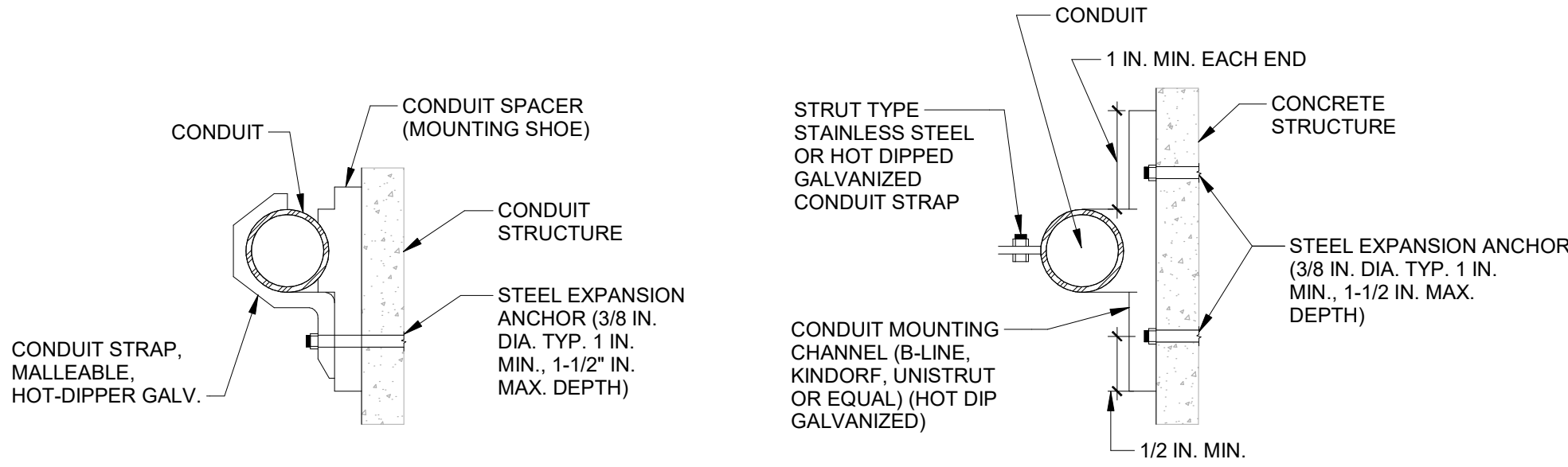


TYPICAL GROUNDING SYSTEM DETAIL

SCALE: NTS

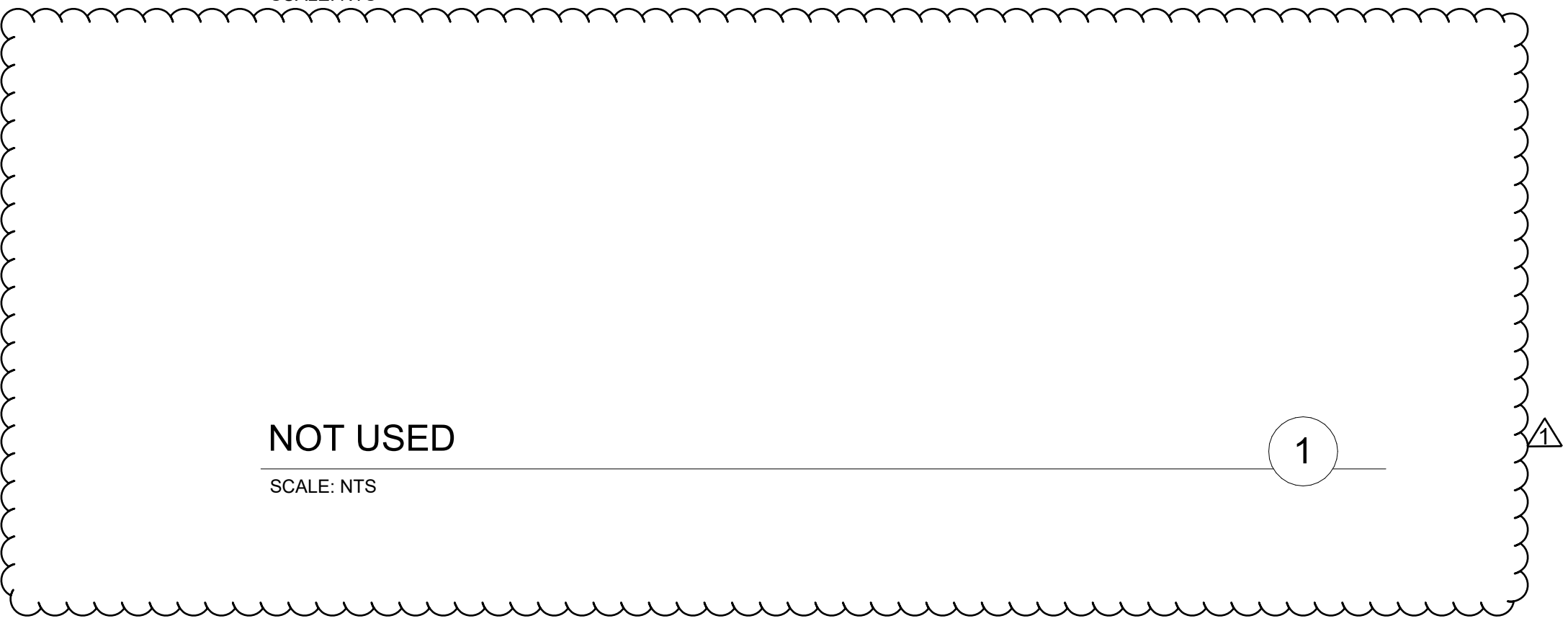
CONDUIT MOUNTING OPTIONS

SCALE: NTS



TYPICAL INTERIOR SLEEVE CONDUIT PENETRATIONS

SCALE: NTS



CONSULTANT:

CERTIFICATE OF AUTHORIZATION #: 0022724

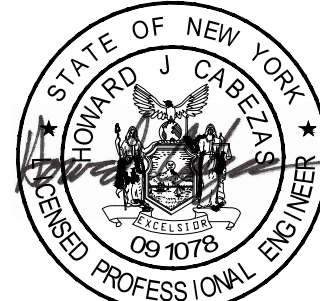


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PROJECT NUMBER:	M3215 - E	
DESIGNED BY:	JLE	
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SHEET TITLE:		

DETAILS

DRAWING NUMBER

E-401

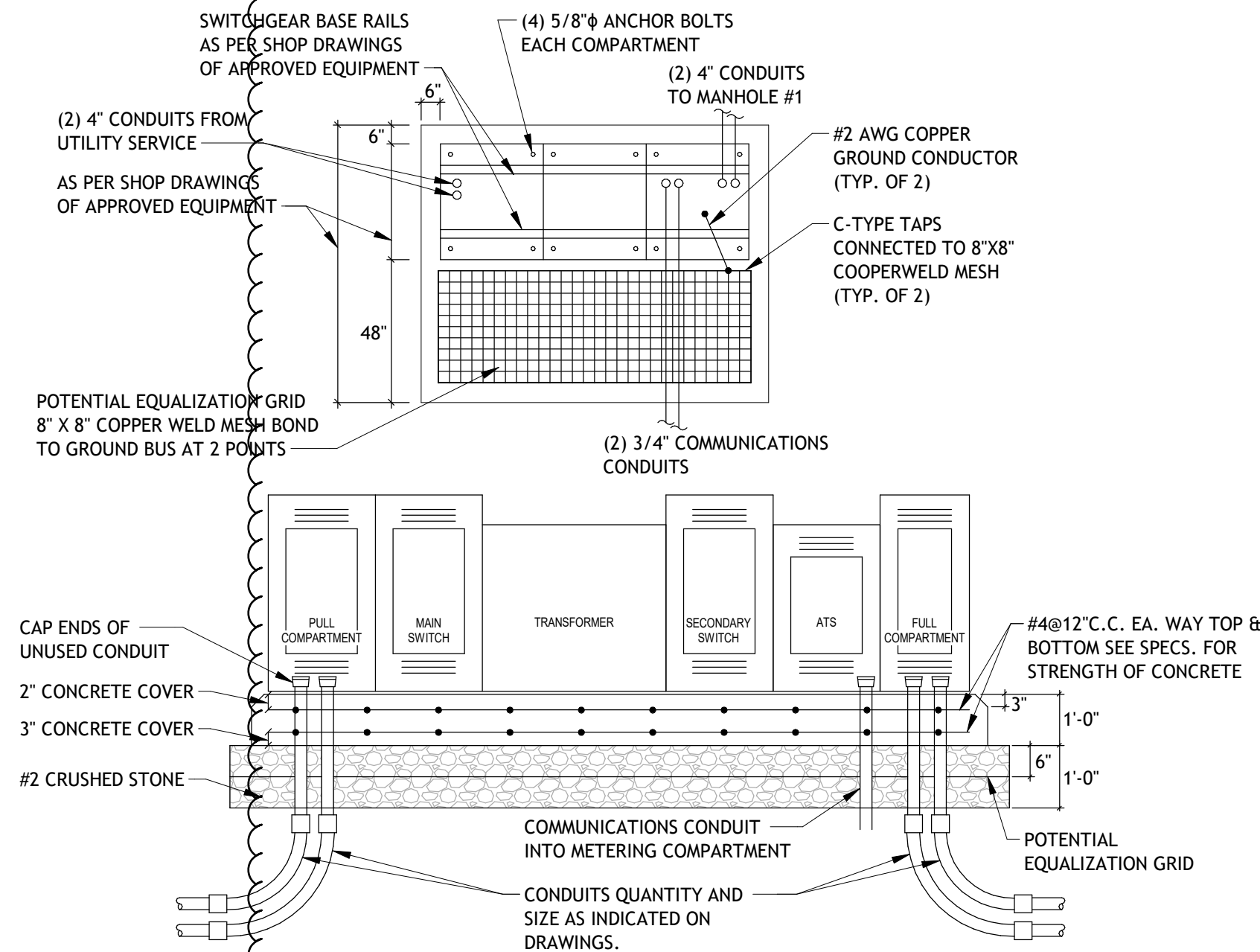
SHEET 46 OF 49

NOTE
REFER TO EARTHWORK AND
TRENCHING SPECIFICATION
SECTION FOR FILL REQUIREMENTS

- EXCAVATE AS REQUIRED FOR DUCTBANK, SLOPE AWAY FROM BUILDING TOWARDS MANHOLES AT .125'/FOOT SLOPE.
- CONCRETE BLOCK TO SUPPORT SPACERS.
- CONDUIT SPACERS, 3" BETWEEN CONDUITS, 3" ALL AROUND CONDUITS, SPACED 5'-0" OC MAX.
- #4 REBARS ON 6" CENTERS, BUT NOT LESS THAN 2 PER RUN. PROVIDE ADDITIONAL RODS ACROSS TOP OF DUCTBANK WHERE CROSSING BENEATH ROADWAY.
- (1)-4" RNC SCH. 80 PRIMARY POWER CONDUIT, (1)-4" RNC SCH. 80 POWER CONDUIT TO MAINTENANCE BLDG., AND (1) 4" RNC SCH 80 SPARE POWER CONDUIT.
- (4) 4" RNC SCH 80 CONDUITS FOR TELECOMMUNICATIONS AND (1) 4" RNC SCH 80 TELECOMMUNICATIONS SPARE CONDUIT.
- 6" CONCRETE ENCASEMENT AROUND AND BETWEEN CONDUITS.
- CLEAN FILL MACHINE COMPACTED IN 4" LIFTS.
- RESTORE TO SUB BASE LEVEL GRADE, FINISH SURFACE RESTORATION BY H-CONTRACT, COORDINATE ON-SITE.
- DETECTABLE UNDERGROUND WARNING TAPE. SEE IDENTIFICATION FOR ELECTRICAL SYSTEMS SPECIFICATIONS.

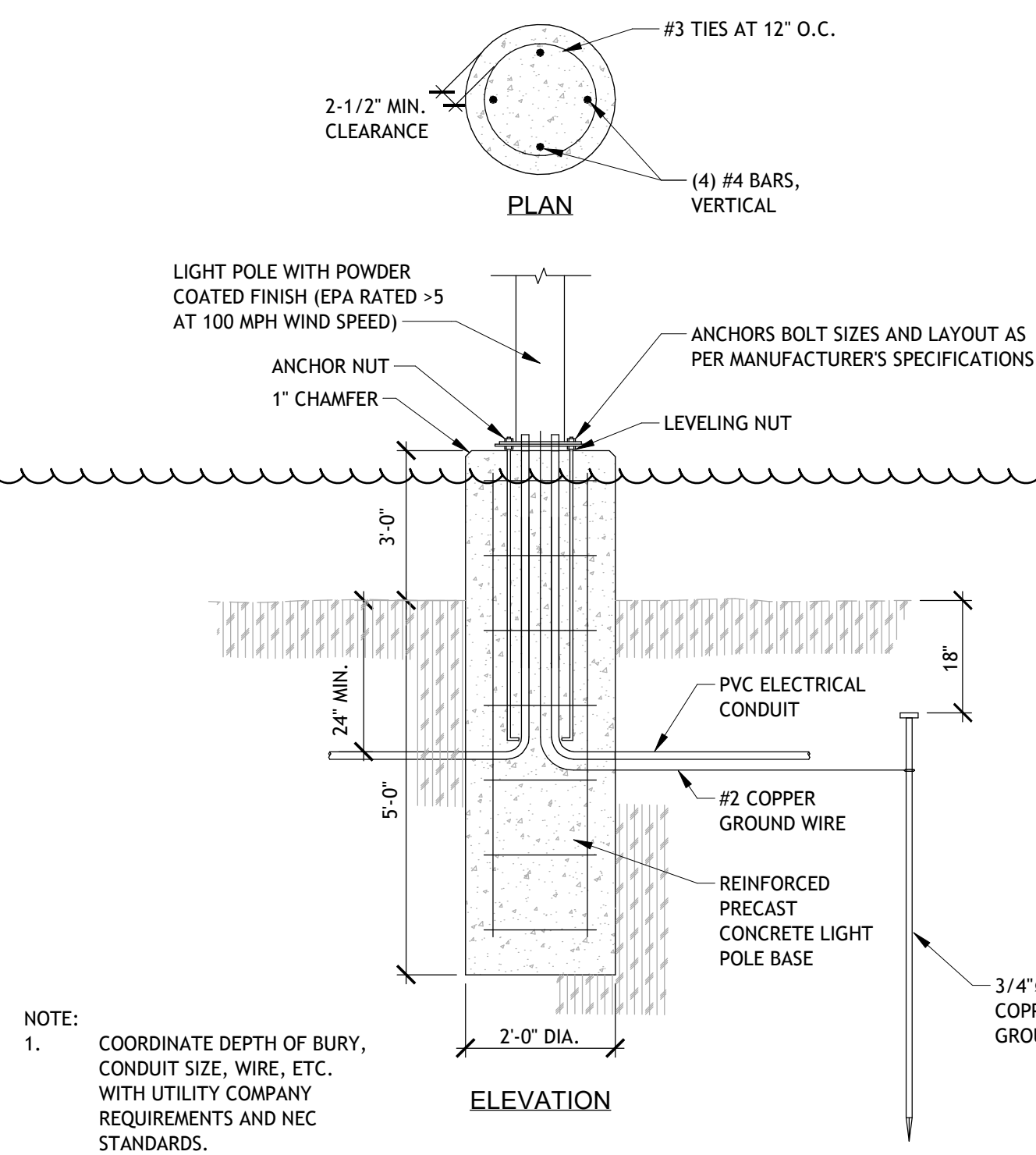
CONCRETE ENCASED POWER / COMMUNICATIONS DUCTBANK

SCALE: NTS



EXTERIOR SWITCHGEAR PAD INSTALLATION DETAIL

SCALE: NTS



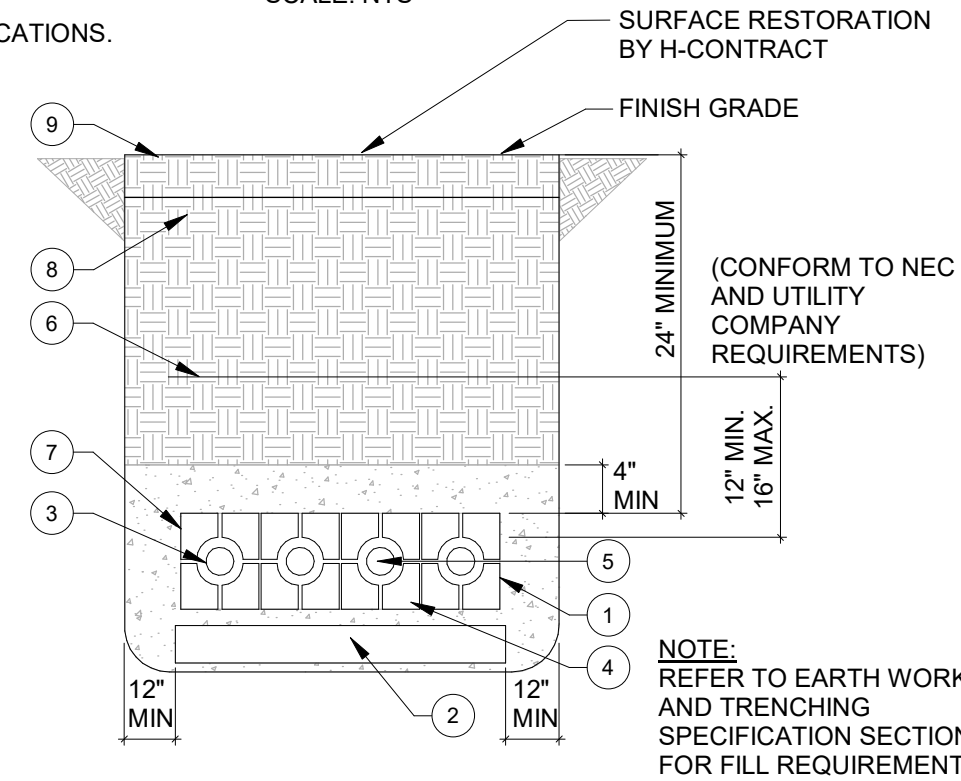
NOTE:
1. COORDINATE DEPTH OF BURY, CONDUIT SIZE, WIRE, ETC. WITH UTILITY COMPANY REQUIREMENTS AND NEC STANDARDS.

TYPICAL LIGHT POLE BASE DETAIL

SCALE: NTS

CONCRETE ENCASED PRIMARY VOLTAGE DUCT BANK DETAIL

SCALE: NTS



NOTE:
REFER TO EARTH WORK
AND TRENCHING
SPECIFICATION SECTION
FOR FILL REQUIREMENTS.

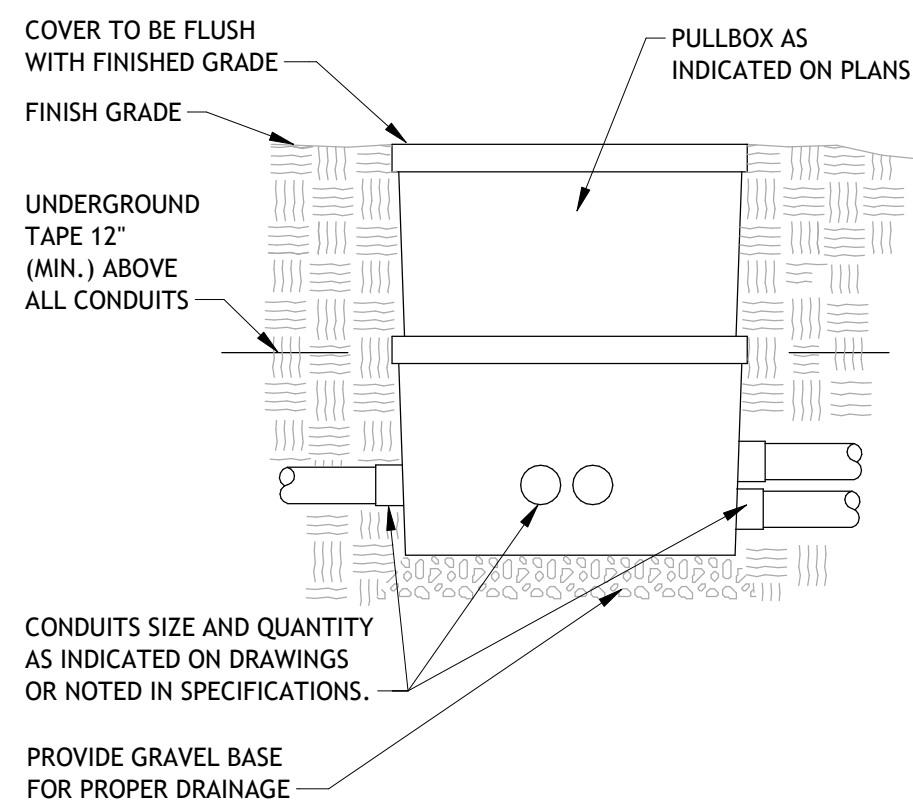
CONCRETE ENCASED DUCT BANK DETAIL

SCALE: NTS

- EXCAVATE AS REQUIRED FOR DUCTBANK, SLOPE AWAY FROM BUILDING TOWARDS MANHOLES AT .125'/FOOT SLOPE.
- CONCRETE BLOCK TO SUPPORT SPACERS.
- CONDUIT SPACERS, 3" BETWEEN CONDUITS, 3" ALL AROUND CONDUITS, SPACED 5'-0" OC MAX.
- #4 REBARS ON 6" CENTERS, BUT NOT LESS THAN 2 PER RUN. PROVIDE ADDITIONAL RODS ACROSS TOP OF DUCTBANK WHERE CROSSING BENEATH ROADWAY.
- SEE PLANS SITE PLAN AND DIAGRAMS FOR CONDUIT SIZING AND QUANTITIES.
- DETECTABLE UNDERGROUND WIRING TAPE, SEE IDENTIFICATIONS FOR ELECTRICAL SYSTEMS SPECIFICATIONS.
- 6" CONCRETE ENCASEMENT AROUND AND BETWEEN CONDUITS.
- CLEAN FILL MACHINE COMPACTED IN 4" LIFTS.
- RESTORE TO SUB BASE LEVEL GRADE, FINISH SURFACE RESTORATION BY H-CONTRACT, COORDINATE ON-SITE.

NOT USED

SCALE: NTS



TYPICAL BURIED PULL BOX DETAIL

SCALE: NTS

GENERAL NOTES

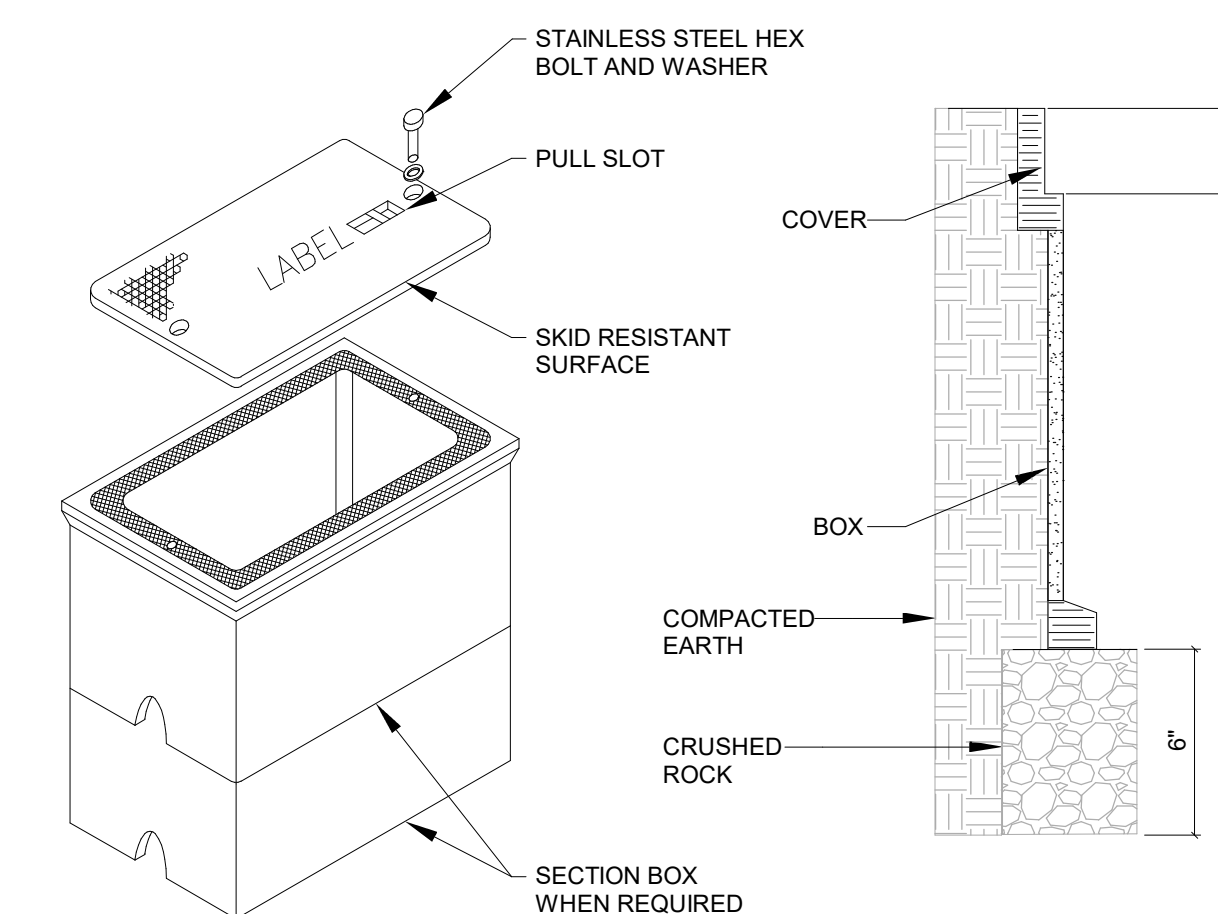
- CONSTRUCTION SHALL BE A POLYMER CONCRETE.
- HANDHOLE TO HAVE 15,000LB DESIGN LOAD AND 22,500LB TEST LOAD.
- ALL HARDWARE SHALL BE STAINLESS STEEL. PROVIDE SLEEVES FOR ALL PENETRATIONS AS NECESSARY.
- BOTTOM SHALL BE OPEN FOR DRAINAGE.
- PROVIDE LOGO ON COVER "ELECTRIC". COVER TO BE SECURED WITH PENTA BOLTS.
- HANDHOLES MUST MEET ALL APPLICABLE REQUIREMENTS OF ANSI/SCITE 77.
- HANDHOLES SHALL MEET MINIMUM SIZE REQUIREMENTS IN ACCORDANCE WITH NEC ARTICLE 314.30
- PROVIDE AS SPLIT HANDHOLE WHERE BOTH POWER AND COMMUNICATION ARE PRESENT CONTRACTOR TO FIELD VERIFY.

DETAIL NOTES:

- DIRECTION OF CONDUIT TO BE DETERMINED BY FIELD APPLICATION.
- NUMBER AND SIZE OF SECONDARY CONDUITS SHOWN ON DRAWINGS AND RISER DIAGRAM.
- IF FENDER POSTS ARE REQUIRED EXTEND CONDUITS 18 INCHES BEYOND THE FENDER POSTS.
- IF PULL BOXES ARE REQUIRED TO FACILITATE INSTALLATION OF THE CABLE, THEY SHALL BE LOCATED 18" BEYOND FENDER POSTS.
- FINISH GRADE SHALL SLOPE AWAY FROM BUILDINGS.
- ALL BACKFILL SHALL BE WELL TAMPED.
- CONCRETE 5000 PSI @ 28 DAYS.
- PAD SHALL MEET H-20 BRIDGE LOADING PLUS 30% IMPACT, REPETITIVE LOADING CONDITION PER AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS SPECIFICATIONS.
- 3/4" CHAMFER ALL EXPOSED EDGES, INCLUDING OPENING.
- ALL BURRS AND SHARP POINT PROJECTIONS ARE TO BE REMOVED.
- BARRIER POSTS SHALL BE 7'-0" IN LENGTH, 4" MINIMUM DIAMETER GALVANIZED STEEL (OR PAINTED STEEL) PIPE FILLED WITH CONCRETE. SET AT A DEPTH OF 3'-0" BELOW FINAL GRADE AND ENCASED IN A 12" DIAMETER CONCRETE BASE.

MEDIUM VOLTAGE PRIMARY RISER POLE

SCALE: NTS

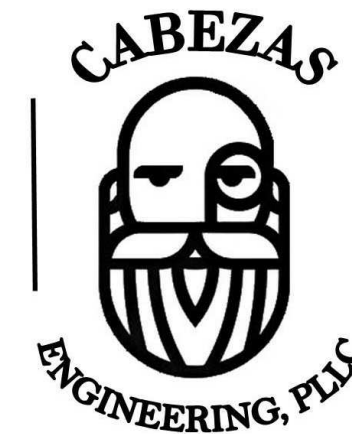


TYPICAL HANDHOLE DETAIL

SCALE: NTS

CONSULTANT:

CERTIFICATE OF AUTHORIZATION #: 0022724



TO THE BEST OF THE ENGINEER'S KNOWLEDGE, BELIEF
AND PROFESSIONAL JUDGEMENT, THESE PLANS AND/OR
SPECIFICATION ARE IN COMPLIANCE WITH THE 2025
ENERGY CONSTRUCTION CODE OF NEW YORK STATE.

TO THE BEST OF THE ENGINEER'S KNOWLEDGE, BELIEF
AND PROFESSIONAL JUDGEMENT, THESE PLANS AND/OR
SPECIFICATION ARE IN COMPLIANCE WITH THE 2025
BUILDING CODE OF NEW YORK STATE.

WARNING:

THE ALTERATION OF THIS MATERIAL IN ANY WAY,
UNLESS DONE UNDER THE DIRECTION OF A COMPARABLE
PROFESSIONAL, I.E. ARCHITECT FOR AN ARCHITECT,
ENGINEER FOR AN ENGINEER OR LANDSCAPE ARCHITECT
FOR A LANDSCAPE ARCHITECT, IS A VIOLATION OF THE
NEW YORK STATE EDUCATION LAW AND/OR REGULATIONS
AND IS A CLASS 'A' MISDEMEANOR.

REGISTRATION EXPIRES:
08/31/2029

CONTRACT:

ELECTRICAL

TITLE:

**REFURBISH BOILER PLANT AND
REPLACE FEEDWATER SYSTEM**

LOCATION:

**WALKILL CORRECTIONAL FACILITY
50 MC KENDRICK RD
WALKILL, NY**

CLIENT:

**DEPARTMENT OF CORRECTIONS AND
COMMUNITY SUPERVISION**

1	9/26/2026	BID ADDENDUM 3
	05/20/2026	BID DOCUMENT
MARK	DATE	DESCRIPTION
PROJECT NUMBER:	M3215 - E	
DESIGNED BY:	JLE	
DRAWN BY:	HNC	
FIELD CHECK:		
APPROVED:	HJC	
SHEET TITLE:		
DETAILS		
DRAWING NUMBER		
E-403		
SHEET 48 OF 49		

MOTOR CONTROL CENTER SCHEDULE									
BUCKET NO.	EQUIPMENT SERVED	MOTOR HP	NEMA STARTER	CONTROL	FRAME SIZE (A)	TRIP SETTING (A)	NUMBER OF POLES		
MAIN	MCC MCB				400	400	3		
1	BOILER 1 - FD FAN	5	1	HOA	100	20	3		
2	BOILER 2 - FD FAN	10	2	HOA	100	30	3		
3	BOILER 3 - FD FAN	10	2	HOA	100	30	3		
4	BURNER 1 - PANEL	-	-	-	100	20	1		
5	BURNER 2 - PANEL	-	-	-	100	20	1		
6	BURNER 3 - PANEL	-	-	-	100	20	1		
7	COMBUSTION CONTROL PANEL	-	-	-	100	20	1		
8	COMBUSTION CONTROL INSTRUMENT	-	-	-	100	20	1		
9	COMBUSTION CONTROL INSTRUMENT	-	-	-	100	20	1		
10	COMBUSTION CONTROL INSTRUMENT	-	-	-	100	20	1		
11	BOILER CHEMICAL FEED CONTROLLER	-	-	-	100	30	1		
12	DEAERATOR CHEMICAL FEED CONTROLLER	-	-	-	100	20	1		
13	AIR COMPRESSOR 1	10	1	HOA	100	30	3		
14	AIR COMPRESSOR 2	10	1	HOA	100	30	3		
15	AIR DRYER AD-1	-	-	HOA	100	15	3		
16	EXG. AIR DRYER 1	-	-	-	100	20	1		
17	EXG. AIR DRYER 2	-	-	-	100	20	1		
18	TRANSFER PUMP TP-1	7.5	1	HOA	100	20	3		
19	TRANSFER PUMP TP-2	7.5	1	HOA	100	20	3		
20	MAU-1	3	0	HOA	100	15	3		
21	EVAP. COOLER PUMP	-	-	-	100	20	1		
22	BOILER TRI-PLEX FUEL OIL PUMP SKID	3	1	-	100	15	3		
23	BOILER BREAK GLASS SWITCH	-	-	-	100	15	1		
24	FWP-1	10	1	HOA	100	30	3		
25	FWP-2	10	1	HOA	100	30	3		
26	FWP-3	10	1	HOA	100	30	3		
27	SPARE	-	-	-	100	20	1		
28	SPARE	-	-	-	100	20	1		
29	TEMPORARY STEAM BOILER 1	-	-	-	200	200	3		
30	TEMPORARY STEAM BOILER 2	-	-	-	200	200	3		
31	MCC-T	-	-	-	100	45	3		
32	25kVA, 480V - 208V/120 TRANSFORMER MCC-T	-	-	-	100	40	3		
	MCC1 - BREAKER PANEL, MCB	-	-	-	100	70	3		

BRANCH CIRCUIT CONDUCTOR AND CONDUIT SCHEDULE			
OVER-CURRENT PROTECTION	PHASE AND/OR NEUTRAL CONDUCTORS	GROUND CONDUCTOR	CONDUIT
THREE POLE CIRCUITS			
50A/3P	#6	#10	1" C
40A/3P	#8	#10	1" C
30A/3P	#10	#10	3/4" C
20A/3P	#12	#12	3/4" C
15A/3P	#12	#12	3/4" C
TWO POLE CIRCUITS			
50A/2P	#6	#10	1" C
40A/2P	#8	#10	3/4" C
30A/2P	#10	#10	3/4" C
20A/2P	#12	#12	3/4" C
15A/2P	#12	#12	3/4" C
ONE POLE CIRCUITS			
40A/1P	#8	#10	3/4" C
30A/1P	#10	#10	3/4" C
20A/1P	#12	#12	3/4" C
15A/1P	#12	#12	3/4" C
A. USE THIS SCHEDULE AS FOLLOWS: -FOR ALL RECEPTACLE AND LIGHTING CIRCUITS. -WHERE SPECIFIC CONDUCTOR/CONDUIT SIZING IS NOT INDICATED ELSEWHERE ON PLANS -FOR ANY BRANCH CIRCUITS THAT ARE REQUIRED TO BE RELOCATED EXTENDED, ETC.			
B. DO NOT USE THIS SCHEDULE AS FOLLOWS: -FOR LARGE MECHANICAL LOADS (REFER TO EQUIPMENT CONNECTION SCHEDULES). -FOR SERVICE ENTRANCE CONDUCTORS -WHERE SPECIFIC CONDUCTORS/CIRCUIT IS INDICATED ON DRAWINGS.			

PANEL: GEN2									
LOCATION: GENERATOR 1 ENCLOSURE					BUS/MAIN: 100A, 3P				
MOUNTING: INTERIOR SURFACE					FEEDER: SEE ONE-LINE DIAGRAM				
VOLTAGE/PHASE: 208Y, 120V, 3Ø4W					FED FROM: DTP1				
MIN AIC RATING: 22,000					ACCESSORIES: NEMA 4 ENCLOSURE WITH LOCK HASP				
CKT #	BRANCH CIRCUIT	LOAD (W)			TRIP POLE#	PHASE	TRIP POLE#	LOAD (W)	BRANCH CIRCUIT
	LOAD DESCRIPTION	A	B	C					LOAD DESCRIPTION
1	LTS - GEN ENCLOSURE	500			*20A,2P	A	*20A,2P	1554	GEN BATTERY CHARGER
3	RECPTS - GEN ENCLOSURE		400		*20A,2P	B	*20A,2P	1600	GEN WATER JACKET HEATER
5	GEN ALTERNATOR - HEATER STRIP			1650	*20A,2P	C	*40A,2P	1650	HEATER STRIP - GEN ENCLOSURE
7		1650				A		1650	
9	SPARE		0		*20A,2P	B	*40A,2P		SPACE
11	SPARE			0	*20A,2P	C			SPACE
13	SPARE	0			-	A	-	0	SPACE
15	SPARE		0		-	B	-	0	SPACE
17	SPACE		0		-	C	-	0	SPACE
19	SPACE	0			-	A	-	0	SPACE
21	SPACE		0		-	B	-	0	SPACE
23	SPACE			0	-	C	-	0	SPACE

MCC1									
LOCATION: INTEGRAL TO MCC					BUS/MAIN: 70A MCB / 100A BUS				
MOUNTING: INTEGRAL TO MCC					FEEDER: MCC BUS				
VOLTAGE/PHASE: 208Y, 120V, 3Ø4W					FED FROM: MCC-T				
MIN AIC RATING: 10,000					ACCESSORIES:				
CKT #	BRANCH CIRCUIT	LOAD (W)			TRIP POLE#	PHASE	TRIP POLE#	LOAD (W)	BRANCH CIRCUIT
	LOAD DESCRIPTION	A	B	C					LOAD DESCRIPTION
1	CONTROLS	0			*20A,1P	A	*20A,1P	0	CONTROLS
3	CONTROLS		0		*20A,1P	B	*20A,1P	0	CONTROLS
5	CONTROLS			0	*20A,1P	C	*20A,1P	0	CONTROLS
7	SPARE	0			*20A,1P	A	*20A,1P	0	SPACE
9	SPARE		0		*20A,1P	B	*20A,1P	0	SPACE
11	SPARE			0	*20A,1P	C	*20A,1P	0	SPACE
13	SPARE	0			*20A,1P	A	*20A,1P	0	SPACE
15	SPARE		0		*20A,1P	B	*20A,1P	0	SPACE
17	SPACE		0		*20A,1P	C	*20A,1P	0	SPACE
19	SPACE	0			*20A,1P	A	*20A,1P	0	SPACE
21	SPACE		0		*20A,1P	B	*20A,1P	0	SPACE
23	SPACE			0	-	C	-	0	SPACE
25	SPACE	0			-	A	-	0	SPACE
27	SPACE		0		-	B	-	0	SPACE
29	SPACE			0	-	C	-	0	SPACE

EQUIPMENT CONNECTION SCHEDULE																								
DISCONNECT TYPES							STARTER TYPES				MOTOR STARTER TYPES													
A- NONFUSED DISCONNECT SWITCH B- FUSED DISCONNECT SWITCH C- SNAP SWITCH WITH OVERLOADS D- CORD & PLUG E- ENCLOSED CIRCUIT BREAKER							1- MAGNETIC X-LINE FVNR 2- COMBINATION STARTER/DISC 3- MANUAL MOTOR STARTER 4- VFD FURNISH BY H-CON, INSTALLED & CONNECTED BY E-CON 5- PACKAGE UNIT BY MANUFACTURER 6- SEE REMARKS				S1- START/STOP PB W/PILOT LIGHT IN COVER S2- H-O-A SWITCH W/PILOT LIGHT IN COVER S3- AUX. CONTACTS S4- SNAP S5- CONTROL TRANSFORMER S6- CONTROLS BY H-CON													
EQUIP TAG	EQUIPMENT DESCRIPTION	LOCATION	HP MCA KW	VOLTS	PHASE	POWER SOURCE		WIRE & CONDUIT		DISCONNECT			STARTER			FIRE ALARM FAN SHUT-DOWN	DUCT MOUNTED SMOKE DETECTOR(S)	ADDITIONAL COMMENTS	EQUIP TAG					
						PANEL / CIRCUIT#	MOP (A)			TYPE	NEMA ENCL.	BY	LOCATION		NEMA ENCL.	BY	LOCATION	STARTER NOTES						
FOP-1	FUEL OIL PUMP 1	WEST BOILER FLOOR	1/3 HP	120	1	DTP1-24	15A, 1P	(2) #12, (1)#12G, 3/4"C		A	1	E-CON	UNIT		5	1	MFR	UNIT	S6	--	--	--	--	FOP-1
FOP-2	FUEL OIL PUMP 2	WEST BOILER FLOOR	1/3 HP	120	1	DTP1-26	15A, 1P	(2) #12, (1)#12G, 3/4"C		A	1	E-CON	UNIT		5	1	MFR	UNIT	S6	--	--	--	--	FOP-2
FOP-3	FUEL OIL PUMP 3	WEST BOILER FLOOR	1/3 HP	120	1	DTP1-28	15A, 1P	(2) #12, (1)#12G, 3/4"C		A	1	E-CON	UNIT		5	1	MFR	UNIT	S6	--	--	--	--	FOP-3
FWP-1	FEED WATER PUMP 1	WEST BOILER FLOOR	10 HP	480	3	MCC BUCKET	25A, 3P	(3)#10, (1)#10N, (1)#12G 3/4"C		A	1	E-CON	MCC		4	1	H-COM	UNIT	S6	--	--	--	--	FWP-1
FWP-2	FEED WATER PUMP 2	WEST BOILER FLOOR	10 HP	480	3	MCC BUCKET	25A, 3P	(3)#10, (1)#10N, (1)#12G 3/4"C		A	1	E-CON	MCC		4	1	H-COM	UNIT	S6	--	--	--	--	FWP-2
FWP-3	FEED WATER PUMP 3	WEST BOILER FLOOR	10 HP	480	3	MCC BUCKET	25A, 3P	(3)#10, (1)#10N, (1)#12G 3/4"C		A	1	E-CON	MCC		4	1	H-COM	UNIT	S6	--	--	--	--	FWP-3
TP-1	TRANSFER PUMP 1	WEST BOILER FLOOR	7.5 HP	480	3	MCC BUCKET	20A, 3P	(3)#12, (1)#12N, (1)#12G 3/4"C		A	1	E-CON	MCC		4	1	H-COM	UNIT	S6	--	--	--	--	TP-1
TP-2	TRANSFER PUMP 2	WEST BOILER FLOOR	7.5 HP	480	3	MCC BUCKET	20A, 3P	(3)#12, (1)#12N, (1)#12G 3/4"C		A	1	E-CON	MCC		4	1	H-COM	UNIT	S6	--	--	--	--	TP-2
EF-1	EXHAUST FAN - 1	MEZZANINE ELECTRIC ROOM	1/2 HP	120	1	LP2-15	20A, 1P	(2)#12, #12G, 3/4"C		A	1	E-CON	UNIT		3	1	H-COM	UNIT	S6	--	--	--	1	EF-1
MAU-1	MAKE-UP AIR UNIT 1	MEZZANINE LEVEL	3 HP	480	3	MCC BUCKET	15A, 3P	(3)#12, (1)#12N, (1)#12G 3/4"C		A	1	MFR	UNIT		4	1	H-COM	UNIT	S6	Y	Y	--	--	MAU-1
AD-1	AIR DRYER - 1	WEST BOILER FLOOR	2.27KW	480	3	MCC BUCKET	15A, 3P	(3)#12, (1)#12N, (1)#12G 3/4"C		A	1	E-CON	UNIT		1	1	MFR	UNIT	S6	--	--	--	--	AD-1
TB-1	TEMPORARY BOILER 1	EXTERIOR	~120 MCA	480	3	MDP	200A, 3P	(3)#4/0, (1)#4/0N, (1)#2G, 2 1/2"C		B	3R	E-CON	UNIT		5	--	--	UNIT	S6	--	--	--	2	TB-1
TB-2	TEMPORARY BOILER 2	EXTERIOR	~120 MCA	480	3	MDP	200A, 3P	(3)#4/0, (1)#4/0N, (1)#2G, 2 1/2"C		B	3R	E-CON	UNIT		5	--	--	UNIT	S6	--	--	--	2	TB-2
NOTE: MANUAL AND MAGNETIC MOTOR CONTROLLERS FURNISHED BY H-CONTRACT, INSTALLED AND CONNECTED BY E-CONTRACT. SEE H-CONTRACT SPEC SECTION 262913.03 AND H-CONTRACT DRAWINGS FOR INFORMATION.																								
EQUIPMENT COMMENTS:																								
1. CONNECT TO SPARE, UNUSED BREAKER AT PANEL INDICATED.																								
2. EXISTING TEMP STEAM BOILER #1 IS FED FROM A 200 AMP SWITCH IN THE EXISTING MDP. WHEN THE NEW ELECTRICAL SERVICE IS UP AND RUNNING, SWITCH OVER TEMP BOILER #1, TO BE FED FROM STAND-BY POWER. GENERATOR POWER. UPON INSTALLATION OF NEW ELECTRIC SERVICE, TEMPORARY STEAM BOILER #1 IS TO BE SWITCHED OVER TO BE FED FROM THE NEW MDP.																								
3. TEMP STEAM BOILER #2, TO BE FED FROM A 200 AMP TAP AHEAD OF 200A FUSED SWITCH SERVING TEMP BOILER #1. WHEN THE NEW ELECTRICAL SERVICE IS UP AND RUNNING, SWITCH OVER TEMPORARY STEAM BOILER #2 SO TO BE FED FROM STAND-BY POWER. GENERATOR POWER. UPON INSTALLATION OF NEW ELECTRIC SERVICE, TEMPORARY STEAM BOILER #2 IS TO BE SWITCHED OVER TO BE FED FROM THE NEW MDP.																								
* - INDICATES NOT REQUIRED OR NOT APPLICABLE																								
*Y- INDICATES YES, REQUIRED																								
*MFR" INDICATES SUPPLIED/INSTALLED BY MANUFACTURER																								

DTP1												
LOCATION: DAY TANK PEDESTAL					BUS/MAIN: 225A BUS / 200A MCB							
MOUNTING: PEDESTAL SURFACE					FEEDER: SEE ONE-LINE DIAGRAM							
VOLTAGE/PHASE: 208Y/120V 3Ø4W					FED FROM: MDP VIA T-DTP1							
MIN AIC RATING: 22,000					ACCESSORIES: NEMA 4 ENCLOSURE WITH LOCK HASP							
CKT #	BRANCH CIRCUIT	LOAD (W)			TRIP POLE#	PHASE	TRIP POLE#	LOAD (W)			BRANCH CIRCUIT	CKT #
	LOAD DESCRIPTION	A	B	C			A	B	C	LOAD DESCRIPTION		
1	DAY TANK SUPPLY PUMP 1	1100			*20A,2P	A	*20A,2P	1100			DAY TANK SUPPLY PUMP 2	2
3	DAY TANK RETURN PUMP		1100		A	B		1100			DAY TANK HEATER 1	4
5				1100	*20A,2P	C	*40A,2P		1100			6
7			1100			A		1100				8
9	DAY TANK HEATER 2		1200		*40A,2P	B	*20A,1P	1200			DAY TANK - FUEL OIL FILTRATION SET	10
11				1200		C	*20A,1P		0		SPARE	12
13	SPARE	0			*40A,2P	A	*20A,1P	200			WP GFCI AT DAY TANK PEDESTAL	14
15	SPARE		0			B	*20A,1P		0		SPARE	16
17	DAY TANK PIPING - HEAT TRACE			1750	*20A,1P	C	*20A,1P		0		SPARE	18
19	DAY TANK PIPING - HEAT TRACE	1750			*20A,1P	A	*20A,1P	1750	DAY TANK PIPING - HEAT TRACE			20
21	DAY TANK PIPING - HEAT TRACE		1750		*20A,1P	B	*20A,1P	1750	DAY TANK PIPING - HEAT TRACE			22
23	SPARE			0	*20A,1P	C	*20A,1P		864		FOP-1	24
25	SPARE	0			*20A,1P	A	*20A,1P	864			FOP-2	26
27	SPARE		0		*20A,1P	B	*20A,1P		864		FOP-3	28
29	SPARE			0	*20A,1P	C	*20A,1P		856		POLE MOUNT LIGHTS	30
31	GENERATOR FUEL OIL PUMP SKID	2650			A	*20A,1P	A	0			SPARE	32
33			2650		*30A,3P	B	*20A,1P		0		SPARE	34
35				2650		C	*20A,1P		0		SPARE	36
37			5354			A		5354				
39	PANEL GEN1		1800		100A,3P	B	100A,3P		1800		PANEL GEN2	40
41				3300		C			3300			42