



Office of General Services

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

ADDENDUM NO. 1 TO PROJECT NO. 47627

ELECTRICAL WORK INSTALL FLEET EV CHARGING SYSTEM STAMFORD REGIONAL SUB-OFFICE 65561 NY-10 STAMFORD, NY

June 12, 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.

SPECIFICATIONS

1. SECTION 032000 CONCRETE REINFORCING: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 032000-1 thru 032000-4) noted "Addendum No. 1."
2. SECTION 260519 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 260519-1 thru 260519-7) noted "Addendum No. 1."
3. SECTION 260543 UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 260543-1 thru 260543-14) noted "Addendum No. 1."
4. SECTION 310000 EARTHWORK: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 310000-1 thru 310000-13) noted "Addendum No. 1."
5. SECTION 321723 PAVEMENT MARKINGS: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 321723-1 thru 321723--3) noted "Addendum No. 1."

END OF ADDENDUM

Brady Sherlock, P.E.
Director, Division of Design
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SECTION 032000 - CONCRETE REINFORCING

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. Steel reinforcement bars.

1.3 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 the following:
 - 1. Each type of steel reinforcement.
 - 2. Bar supports.
- E. Submit an Environmental Product Declaration (EPD) from the manufacturer for steel reinforcement bar and mesh 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. Shop Drawings: Comply with ACI SP-066:
 - 1. Include placing drawings that detail fabrication, bending, and placement.
 - 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.

- G. Qualification Statements: For testing and inspection agency.
- H. Material Test Reports: For the following, from a qualified testing agency:
 - 1. Steel Reinforcement
- I. Field quality-control reports.
- J. Minutes of preinstallation conference.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4.
- C. If the value of the contract exceeds \$100,000 all structural steel, reinforcing steel and other major steel items to be incorporated in the Work of this Contract shall be produced and made in whole or substantial part in the United States, its territories or possessions.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. and to avoid damaging coatings on steel reinforcement.
 - 1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615, Grade 60, deformed.

2.2 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

- a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

B. Zinc Repair Material: ASTM A780.

2.3 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.
- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars shall be lapped not less than 36 bar diameters at splices, or 24 inches, whichever is greater.
 - 2. Stagger splices in accordance with ACI 318.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Director's Representative.
 - 1. Place joints perpendicular to main reinforcement.

2. Continue reinforcement across construction joints unless otherwise indicated.
 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

END OF SECTION 032000

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

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. Copper building wire.
 - 2. Connectors and splices.

1.3 DEFINITIONS

- A. PV: Photovoltaic.
- B. RoHS: Restriction of Hazardous Substances.
- C. VFC: Variable-frequency controller.

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 each type of product.
- E. Product Schedule: Indicate type, use, location, and termination locations.
- F. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
- G. Qualification Data: For testing agency and manufacturer's authorized service representative.
- H. Field quality-control reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.
- B. Qualifications: The persons performing the Work of this Section and their supervisor shall be personally experienced in electrical work and shall have been regularly performing such work for a minimum of 3 years.
- C. UL Listing: Equipment and materials for which Underwriters' Laboratories, Inc. (UL) provides product listing service shall be listed and bear the listing mark.
- D. Underwriter's Certificate: A New York Board of Fire Underwriters inspection or certificate is not required.
- E. Equipment Qualifications For Products Other Than Those Specified:
 - 1. At the time of submission provide written notice to the Director of the intent to propose an "or equal" for products other than those specified. Make the "or equal" submission in a timely manner to allow the Director sufficient time to review the proposed product, perform inspections and witness test demonstrations.
 - 2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the Director's Representative owners of the 5 comparable installations will allow inspection of their installation by the Director's Representative and the Company Field Advisor.
 - a. Only references from the actual Director's Representative owner or Director's Representative owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted. References from dealers, system installers or others, who are not the actual Director's Representative owners of the proposed products, are not acceptable.
 - 1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.
 - 3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
 - a. Make arrangements with the test facility for the Director's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Director a minimum of 3 weeks prior to the availability of the test facility, and provide at least one alternative date for the testing.
 - 4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.
- F. Company Field Advisor: Secure the services of the cable manufacturer's Company Field Advisor for a minimum of 4 working hours at the contract site for the following:

1. Witness installation of at least one splice and termination by each person who will be doing the actual cable splice and termination.
2. Certify with an affidavit that the aforementioned particulars are satisfactory and the cable is installed in accordance with cable manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 DATE OF MANUFACTURER:

2.2 COPPER BUILDING WIRE

- A. Description: Flexible, insulated, and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. 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. Cerro Wire LLC.
 2. General Cable Technologies Corporation.
 3. Southwire Company.
 4. Or equal.
- C. Standards:
 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
 2. RoHS compliant.
 3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- E. Conductor Insulation:
 1. Type NM: Comply with UL 83 and UL 719.
 2. Type XHHW-2: Comply with UL 44.

2.3 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. 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. 3M Electrical Products.
 2. Appleton - O-Z/Gedney; Emerson Electric Co., Automation Solutions.
 3. Ideal Industries, Inc.
 4. Or equal.
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper
 2. Type: Two hole with standard barrels.
 3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders:
1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
 2. Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger.
- B. Branch Circuits:
1. Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type XHHW-2, single conductors in raceway.
- B. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.
- C. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

3.3 INSTALLATION, GENERAL

- A. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 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."

3.7 FIELD QUALITY CONTROL

- A. Administrant for Tests and Inspections:
 - 1. Director's Representative will engage qualified testing agency to administer and perform tests and inspections.
 - 2. Engage qualified testing agency to administer and perform tests and inspections.
 - 3. Engage factory-authorized service representative/Company Service Advisor to administer and perform tests and inspections on components, assemblies, and equipment installations, including connections.
 - 4. Administer and perform tests and inspections with assistance of Company Service Advisor/factory-authorized service representative hired by the Contractor (at no additional cost to the owner).
- B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors and conductors feeding the following critical equipment and services for compliance with requirements:
 - a. Switchboard Main (Transformer Secondary)
 - b. Switchboard Branch Feeders (To the Charging Stations)
 2. Perform each of the following visual and electrical tests:
 - a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.
 3. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
 - a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
 4. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- C. Cables will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports to record the following:
1. Procedures used.
 2. Results that comply with requirements.
 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS 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, including GRC and PVC-coated steel conduit.
2. Rigid nonmetallic duct.
3. Duct accessories.
4. Precast concrete handholes.
5. Polymer concrete handholes and boxes with polymer concrete cover.
6. Utility structure accessories.

1.3 DEFINITIONS

- A. Direct Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials such as concrete.
- B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.
- C. Duct Bank:
 1. Two or more ducts installed in parallel, with or without additional casing materials.
 2. Multiple duct banks.
- D. GRC: Galvanized rigid (steel) conduit.
- E. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

1.4 ACTION 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 each type of product.
 - 1. Include duct-bank materials, including spacers and miscellaneous components.
 - 2. Include duct, conduits, and their accessories, including elbows, end bells, bends, fittings, and solvent cement.
 - 3. Include accessories for manholes, handholes, boxes.
 - 4. Include underground-line warning tape.
 - 5. Include warning planks.
- E. Submit an Environmental Product Declaration (EPD) from the manufacturer for steel conduit and precast handholes and boxes 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. Shop Drawings:
 - 1. Precast or Factory-Fabricated Underground Utility Structures (Utility Transformer Pad/Vault):
 - a. Include plans, elevations, sections, details, attachments to other work, and accessories.
 - b. Include duct entry provisions, including locations and duct sizes.
 - c. Include reinforcement details.
 - d. Include frame and cover design
 - e. Include grounding details.
 - f. Include dimensioned locations of cable rack inserts, pulling-in and lifting irons, and sumps.
 - g. Include joint details.
 - 2. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:
 - a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
 - b. Include duct entry provisions, including locations and duct sizes.
 - c. Include cover design.
 - d. Include grounding details.
 - e. Include dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
- G. Coordination Drawings: For duct and duct bank. Show duct profiles and coordination with other utilities and underground structures.
 - 1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
 - 2. Drawings shall be signed and sealed by a qualified professional engineer.

- H. Qualification Data: For professional engineer and testing agency responsible for testing nonconcrete handholes and boxes.
- I. Product Certificates: For concrete and steel used in precast concrete handholes, as required by ASTM C858.
- J. Source quality-control reports.
- K. Field quality-control reports.

1.5 MAINTENANCE MATERIALS SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Furnish cable-support stanchions, arms, and associated fasteners in quantities equal to **5**percent of quantity of each item installed.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.
- B. Qualifications of Supervisor: The person supervising the Work of this Section shall be personally experienced in this type of Work and shall have been regularly employed by a company engaged in underground pipe or conduit cleaning for a minimum of 2 years.
 - 1. Furnish to the Director Representative the names and addresses of 3 similar projects which the supervisor has worked on.

1.7 FIELD CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Director's Representative Owner or others unless permitted under the following conditions, and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Notify Construction Manager no fewer than two days in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without Construction Manager's written permission.
- B. Ground Water: Assume ground-water level is at grade level unless a lower water table is noted on Drawings.
- C. Ground Water: Assume ground-water level is **36 inches (900 mm)** below ground surface unless a higher water table is noted on Drawings.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND FITTINGS

- A. GRC: Comply with ANSI C80.1 and UL 6.
- B. 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. Atkore International (Allied Tube & Conduit).
 - 2. Western Tube and Conduit Corporation.
 - 3. Wheatland Tube Company.
 - 4. Or equal.
- C. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.

2.2 RIGID NONMETALLIC DUCT

- A. Underground Plastic Utilities Duct: Type EPC-40-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.
- B. 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. Cantex Inc.
 - 2. National Pipe & Plastics.
 - 3. Opti-Com Manufacturing Network, Inc (OMNI).
 - 4. Or equal.
- C. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
- D. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 DUCT ACCESSORIES

- A. Duct Spacers: Factory-fabricated, rigid, PVC interlocking spacers; sized for type and size of duct with which used and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.
 - 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. Atkore International (Allied Tube & Conduit).
 - b. Cantex Inc.
 - c. Carlon; a brand of Thomas & Betts Corporation.

- d. Or equal.
- B. Concrete Warning Planks: Nominal 12 by 24 by 3 inches (300 by 600 by 75 mm) in size, manufactured from 6000-psi (41-MPa) concrete.
 - 1. Color: Red dye added to concrete during batching.
 - 2. Mark each plank with "ELECTRIC" in 2-inch- (50-mm-) high, 3/8-inch- (10-mm-) deep letters.
- C. Drag Line
 - 1. Minimum 1/8" polypropylene monofilament utility rope:
 - a. Southwire QWIKLine PL6500
 - b. Greenlee Tool Co.'s 2 ply Rope 431
 - c. Ideal's Pro-Pull Rope 3/16
 - d. Garden Bender Poly-Pull Line 6500 PL232.
- D. Conduit Seals
 - 1. Wood or plastic plugs designed for the purpose or a contrasting color cement/sand mixture. Seals shall be removable for future use of conduits. Seals shall include waterproof tag stating "CONDUIT CLEANED" and date (month, year).

2.4 PRECAST CONCRETE HANDHOLES AND BOXES

- A. Description: Factory-fabricated, reinforced-concrete, monolithically poured walls and bottom unless open-bottom enclosures are indicated. Frame and cover shall form top of enclosure and shall have load rating consistent with that of handhole or box.
- B. 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. Oldcastle Precast, Inc.
 - 2. Tindall Corp.
 - 3. Wausau Tile Inc.
 - 4. Or equal.
- C. Comply with ASTM C858 for design and manufacturing processes.
- D. Frame and Cover: Weatherproof cast-iron frame, with cast-iron cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
- E. Frame and Cover: Weatherproof steel frame, with steel cover with recessed cover hook eyes and tamper-resistant, captive, cover-securing bolts.
- F. Frame and Cover: Weatherproof steel frame, with hinged steel access door assembly with tamper-resistant, captive, cover-securing bolts.
 - 1. Cover Hinges: Concealed, with hold-open ratchet assembly.

2. Cover Handle: Recessed.
- G. Frame and Cover: Weatherproof aluminum frame with hinged aluminum access door assembly with tamper-resistant, captive, cover-securing bolts.
1. Cover Hinges: Concealed, with hold-open ratchet assembly.
 2. Cover Handle: Recessed.
- H. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- I. Cover Legend: Molded lettering, "ELECTRIC."
- J. Configuration: Units shall be designed for flush burial and have closed bottom unless otherwise indicated.
- K. Extensions and Slabs: Designed to mate with bottom of enclosure. Same material as enclosure.
1. Extension shall provide increased depth of 12 inches (300 mm).
 2. Slab: Same dimensions as bottom of enclosure and arranged to provide closure.
- L. Joint Sealant: Asphaltic-butyl material with adhesion, cohesion, flexibility, and durability properties necessary to withstand maximum hydrostatic pressures at the installation location with the ground-water level at grade.
- M. Knockout Panels: Precast openings in walls, arranged to match dimensions and elevations of approaching duct, plus an additional 12 inches (300 mm) vertically and horizontally to accommodate alignment variations.
1. **Center window** location.
 2. Knockout panels shall be located no less than 6 inches (150 mm) from interior surfaces of walls, floors, or frames and covers of handholes, but close enough to corners to facilitate racking of cables on walls.
 3. Knockout panel opening shall have cast-in-place, welded-wire fabric reinforcement for field cutting and bending to tie in to concrete envelopes of duct.
 4. Knockout panels shall be framed with at least two additional No. 3 steel reinforcing bars in concrete around each opening.
 5. Knockout panels shall be 1-1/2 to 2 inches (38 to 50 mm) thick.
- N. Duct Entrances in Handhole Walls: Cast end-bell or duct-terminating fitting in wall for each entering duct.
1. Type and size shall match fittings to duct to be terminated.
 2. Fittings shall align with elevations of approaching duct and be located near interior corners of handholes to facilitate racking of cable.
- O. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.5 POLYMER CONCRETE HANDHOLES AND BOXES WITH POLYMER CONCRETE COVER

- A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.
- B. 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. Armorcast; Hubbell Incorporated, Power Systems.
 - 2. Oldcastle Enclosure Solutions.
 - 3. Quazite; Hubbell Incorporated, Power Systems.
 - 4. Or equal.
- C. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.
- D. Color: Gray.
- E. Configuration: Units shall be designed for flush burial and have closed bottom unless otherwise indicated.
- F. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
- G. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
- H. Cover Legend: Molded lettering, "ELECTRIC."
- I. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.
- J. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering duct for secure, fixed installation in enclosure wall.
- K. Handholes 12 inches wide by 24 inches long (300 mm wide by 600 mm long and larger shall have factory-installed inserts for cable racks and pulling-in irons.

2.6 SOURCE QUALITY CONTROL

- A. Test and inspect precast concrete utility structures according to ASTM C1037.
- B. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of manholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.
 - 1. Tests of materials shall be performed by an independent testing agency.

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

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate layout and installation of duct, duct bank, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.
- B. Coordinate elevations of duct and duct-bank entrances into handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct and duct bank will drain to handholes, and as approved by Architect.

3.2 UNDERGROUND DUCT APPLICATION

- A. Duct for Electrical Feeders 600 V and Less: Type EPC-40-PVC RNC, concrete-encased unless otherwise indicated.
- B. Duct for Electrical Feeders 600 V and Less: Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.
- C. Duct for Electrical Branch Circuits: Type EPC-40-PVC RNC, direct-buried unless otherwise indicated.
- D. Underground Ducts Crossing Paved Paths and Roadways: Type EPC-40 PVC RNC, encased in reinforced concrete.
- E. Stub-ups: Concrete-encased GRC.

3.3 UNDERGROUND ENCLOSURE APPLICATION

- A. Handholes and Boxes for 600 V and Less:
 1. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
 2. Cover design load shall not exceed the design load of the handhole or box.

3.4 EARTHWORK

- A. Restoration: Replace area immediately after backfilling is completed or after construction vehicle traffic in immediate area is complete.
- B. Restore surface features at areas disturbed by excavation and re-establish original grades unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Restore vegetation and include necessary topsoiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses".

3.5 DUCT AND DUCT-BANK INSTALLATION

- A. Where indicated on Drawings, install duct, spacers, and accessories into the duct-bank configuration shown. Duct installation requirements in this Section also apply to duct bank.
- B. Install duct according to NEMA TCB 2.
- C. Slope: Pitch duct a minimum slope of 1:300 down toward handholes and away from buildings and equipment. Slope duct from a high point between two handholes, to drain in both directions.
- D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches (1200 mm) both horizontally and vertically, at other locations unless otherwise indicated.
 - 1. Duct shall have maximum of two 90 degree bends or the total of all bends shall be no more 180 degrees between pull points.
- E. Joints: Use solvent-cemented joints in duct and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent duct do not lie in same plane.
- F. Installation Adjacent to High-Temperature Steam Lines: Where duct is installed parallel to underground steam lines, perform calculations showing the duct will not be subject to environmental temperatures above 40 deg C. Where environmental temperatures are calculated to rise above 40 deg C, and anywhere the duct crosses above an underground steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.
- G. End Bell Entrances to Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches (250 mm) o.c. for 5-inch (125-mm) duct, and vary proportionately for other duct sizes.
 - 1. Begin change from regular spacing to end-bell spacing 10 feet (3 m) from the end bell, without reducing duct slope and without forming a trap in the line.
 - 2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to handhole. Install an expansion fitting near the center of all straight line direct-buried duct with calculated expansion of more than 3/4 inch (19 mm).
 - 3. Grout end bells into structure walls from both sides to provide watertight entrances.

- H. Terminator Entrances to Concrete and Polymer Concrete Handholes: Use manufactured, cast-in-place duct terminators, with entrances into structure spaced approximately 6 inches (150 mm) o.c. for 4-inch (100-mm) duct, and vary proportionately for other duct sizes.
1. Begin change from regular spacing to terminator spacing 10 feet (3 m) from the terminator, without reducing duct line slope and without forming a trap in the line.
 2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to handhole. Install an expansion fitting near the center of all straight line duct with calculated expansion of more than 3/4 inch (19 mm).
- I. Sealing: Provide temporary closure at terminations of duct with pulled cables. Seal spare duct at terminations. Use sealing compound and plugs to withstand at least 15-psig (1.03-MPa) hydrostatic pressure.
- J. Pulling Cord: Install 200-lbf- (1000-N-) test nylon cord in empty ducts.
- K. Concrete-Encased Ducts and Duct Bank:
1. Excavate trench bottom to provide firm and uniform support for duct. Prepare trench bottoms as specified in Section 310000 "Earthworks" for pipes less than 6 inches (150 mm) in nominal diameter.
 2. Width: Excavate trench 12 inches (300 mm) wider than duct on each side.
 3. Width: Excavate trench 3 inches (75 mm) wider than duct on each side.
 4. Depth: Install so top of duct envelope is at least 24 inches (600 mm) below finished grade in areas not subject to deliberate traffic, and at least 30 inches (750 mm) below finished grade in deliberate traffic paths for vehicles unless otherwise indicated.
 5. Support duct on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
 6. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than **five** spacers per 20 feet (6 m) of duct. Place spacers within 24 inches (600 mm) of duct ends. Stagger spacers approximately 6 inches (150 mm) between tiers. Secure spacers to earth and to duct to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
 7. Minimum Space between Duct: 3 inches (75 mm) between edge of duct and exterior envelope wall, 1 inches (25 mm) between ducts for like services, and 4 inches (100 mm) between power and communications ducts.
 8. Elbows: Use manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct unless otherwise indicated. Extend encasement throughout length of elbow.
 9. Elbows: Use manufactured GRC elbows for stub-ups, at building entrances, and at changes of direction in duct run.
 - a. Couple RNC duct to GRC with adapters designed for this purpose and encase coupling with 3 inches (75 mm) of concrete.
 - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches (1500 mm) from edge of base. Install insulated grounding bushings on terminations at equipment.

- 1) Stub-ups shall be minimum 4 inches (100 mm) above finished floor and minimum 3 inches (75 mm) from conduit side to edge of slab.
 10. Reinforcement: Reinforce concrete-encased duct where crossing disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
 11. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
 12. Concrete Cover: Install a minimum of 3 inches (75 mm) of concrete cover between edge of duct to exterior envelope wall, 1 inches (25 mm) between duct of like services, and 4 inches (100 mm) between power and communications ducts.
 13. Concreting Sequence: Pour each run of envelope between manholes or other terminations in one continuous operation.
 - a. Start at one end and finish at the other, allowing for expansion and contraction of duct as its temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written instructions or use other specific measures to prevent expansion-contraction damage.
 - b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch (15-mm) reinforcing-rod dowels extending a minimum of 18 inches (450 mm) into concrete on both sides of joint near corners of envelope.
 14. Pouring Concrete: Comply with requirements in "Concrete Placement" Article in Section 033000 "Cast-in-Place Concrete." Place concrete carefully during pours to prevent voids under and between duct and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Allow concrete to flow around duct and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-installation application.
- L. Direct-Buried Duct and Duct Bank:
1. Excavate trench bottom to provide firm and uniform support for duct. Comply with requirements in Section 310000 "Earthwork" for preparation of Prepare trench bottoms for pipes less than 6 inches (150 mm) in nominal diameter.
 2. Width: Excavate trench 12 inches (300 mm) wider than duct on each side.
 3. Width: Excavate trench 3 inches (75 mm) wider than duct on each side.
 4. Depth: Install top of duct at least 36 inches (900 mm) below finished grade unless otherwise indicated.
 5. Set elevation of bottom of duct bank below frost line.
 6. Support ducts on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
 7. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than **five** spacers per 20 feet (6 m) of duct. Place spacers within 24 inches (600 mm) of duct ends. Stagger spacers approximately 6 inches (150 mm) between tiers. Secure spacers to earth and to ducts to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
 8. Install duct with a minimum of 3 inches (75 mm) between ducts for like services and 6 inches (150 mm) between power and communications duct.

9. Elbows: Install manufactured duct elbows for stub-ups, at building entrances, and at changes of direction in duct direction unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
 10. Install manufactured GRC elbows for stub-ups, at building entrances, and at changes of direction in duct.
 - a. Couple RNC duct to GRC with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
 - b. Stub-ups to Outdoor Equipment: Extend concrete-encased GRC horizontally a minimum of 60 inches (1500 mm) from edge of base. Install insulated grounding bushings on terminations at equipment.
 - 1) Stub-ups shall be minimum 4 inches (100 mm) above finished floor and minimum 3 inches (75 mm) from inches from conduit side to edge of slab.
 11. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches (100 mm) over duct and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 310000 "Earthwork" for installation of backfill materials.
 - a. Place minimum 3 inches (75 mm) of sand as a bed for duct. Place sand to a minimum of 6 inches (150 mm) above top level of duct.
 - b. Place minimum 6 inches (150 mm) of engineered fill above concrete encasement of duct.
- M. Underground-Line Warning Tape: Bury nonconducting underground line specified in Section 260553 "Identification for Electrical Systems" no less than 12 inches (300 mm) above all concrete-encased duct and duct banks **and approximately 12 inches (300 mm) below grade**. Align tape parallel to and within 3 inches (75 mm) of centerline of duct bank. Provide an additional warning tape for each 12-inch (300-mm) increment of duct-bank width over a nominal 18 inches (450 mm). Space additional tapes 12 inches (300 mm) apart, horizontally.

3.6 INSTALLATION OF CONCRETE HANDHOLES, AND BOXES

A. Precast Concrete Handhole and Manhole Installation:

1. Comply with ASTM C891 unless otherwise indicated.
2. Install units level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances.
3. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1-inch (25-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

B. Elevations:

1. Handhole Covers: In paved areas and trafficways, set surface flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.

2. Where indicated, cast handhole cover frame integrally with handhole structure.

C. Field-Installed Bolting Anchors in Concrete Handholes: Do not drill deeper than 2 inches (50 mm) for handholes, for anchor bolts installed in the field. Use a minimum of two anchors for each cable stanchion.

3.7 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct, and seal joint between box and extension as recommended by manufacturer.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.

D. Field cut openings for duct according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

E. For enclosures installed in asphalt paving and grass and subject to occasional, nondeliberate, heavy-vehicle loading, form and pour a concrete ring encircling, and in contact with, enclosure and with top surface screeded to top of box cover frame. Bottom of ring shall rest on compacted earth .

1. Concrete: 3000 psi (20 kPa), 28-day strength., complying with Section 033000 "Cast-in-Place Concrete," with a troweled finish.

3.8 Dimensions: 10 inches wide by 12 inches deep (250 mm wide by 300 mm deep)FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.

2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch- (300-mm-) long mandrel equal to duct size minus 1/4 inch (6 mm). If obstructions are indicated, remove obstructions and retest.

3. Test **handhole** grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

- C. Prepare test and inspection reports.

3.9 CLEANING

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

END OF SECTION 260543

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. Site Clearing:
 - a. Protecting existing vegetation to remain.
 - b. Removing existing vegetation.
 - c. Clearing and grubbing.
 - d. Stripping and stockpiling topsoil and rock.
 - e. Removing above- and below-grade improvements.
- 2. Excavation:
 - a. Excavating for structures.
 - b. Excavating trenches for utilities and pits for buried utility structures.
- 3. Fill and Backfill:
 - a. Backfilling for site structures to subgrade elevations.
 - b. Backfilling for trenches.
 - c. Fill under slabs-on-grade.
 - d. Fill under pavements.
 - e. Fill for over-excavation.
 - f. Subsurface drainage backfill for walls and trenches.
- 4. Preparation of subgrades.
- 5. Compaction.
- 6. Rough and final grading.

B. Related Requirements:

- 1. Section 310001 – Earthwork Materials.
- 2. Section 312500 – Erosion and Sedimentation Controls.
- 3. Section 329200 – Turf and Grasses.

1.3 REFERENCE STANDARDS

A. ASTM International:

1. ASTM C88 - Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
 2. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 3. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³).
 4. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³).
 5. ASTM D2419 – Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
 6. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).
 7. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 8. ASTM D2974 – Standard Test Methods for Determining the Water (moisture) Content, Ash Content, and Organic Material of Peat and Other Organic Soils.
 9. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 10. ASTM D4373 - Standard Test Method for Rapid Determination of Carbonate Content of Soils
 11. ASTM D4873 – Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.
 12. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- B. New York State Department of Transportation (NYS DOT) Standard Specifications
1. Section 620 - Bank and Channel Protection
 2. Section 703 - Aggregates
- C. Related Requirements:
1. Local utility standards when working in close proximity to utility lines.
 2. Occupational Safety and Health Administration: Comply with the applicable requirements of the Code of Federal Regulations Title 29 – Labor, Part 1926 Safety and Health Regulations for Construction (OSHA).
- D. New York State Office of General Services (NYS OGS) Standard Specifications
1. Section 310001 - Earthwork Materials
- 1.4 DEFINITIONS
- A. Surface Soil: Soil that is present at the top layer of the existing soil profile.
- B. Subsurface: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsurface; reasonably free of subsurface soils, clay lumps, gravel, weeds, roots, toxic materials, or other non-soil materials.
- D. Borrow Soil: Approved soil imported from off-site for use as fill or backfill.

- E. Backfill: Soil material or controlled low-strength material used to fill an excavation.
 - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
 - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.
- F. Fill: Soil materials used to raise existing grades.
- G. Suitable Material (Fill and Backfill for Landscaped Areas): Material generally consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof. Maximum particle size will not exceed 2/3 of the specified layer thickness prior to compaction. Topsoil and organic silt may be used as suitable material in landscaped areas provided it is placed as the surface soil.
- H. Unsuitable Material: Material containing cinders, industrial waste, sludge, building/construction rubble, land fill, muck, and peat.
- I. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage material, or topsoil materials.
- J. Subbase Course: Aggregate layer placed between the subgrade and asphaltic or concrete pavement section or concrete structure.
- K. Bedding Course (Cushion Material): Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- L. Drainage Material: Aggregate layer with minimal material passing the #200 sieve to promote downward water flow and minimizes upward capillary flow of pore water.
- M. Classified Earth Excavation: Removal of all surface and subsurface material not classified as rock, to the lines and dimensions indicated.
- N. Rock: Limestone, sandstone, shale, granite and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.
 - 1. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition which can be removed with an excavator or backhoe equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
 - 2. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
- O. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Director's Representative. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
- P. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.

- Q. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Director's Representative. Unauthorized excavation, as well as remedial work directed by Director's Representative, shall be without additional compensation.
- R. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
- S. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.
- T. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.
- U. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
- V. Grading Limit Line (Shown on Drawings): Limits of grading, excavations and filling required for the Work. Unless specifically noted otherwise, the Grading Limit Line, Limits of Disturbance, and Contract Limit Line shall be considered the same.

1.5 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain State's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 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. Existing Conditions: Submit documentation before earthwork activities begin of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by the Work of this Section.
 - 1. Use sufficiently detailed photographs or video recordings.
 - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

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. Salvageable Improvements: Carefully remove items indicated to be salvaged and coordination storage and reinstallation with the Owner.
- C. Do not commence operations until temporary site fencing and erosion and sedimentation control measures are in place.
- D. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

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 site features, to remain, from damage during construction. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
 1. Restore damaged improvements to their original condition, as acceptable to the Director's Representative.
- C. Protect and maintain erosion and sedimentation controls during earth-moving operations.
- D. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide and maintain temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, in accordance with Section 312500 Erosion & Sedimentation Controls, the Contract Drawings, and requirements of authorities having jurisdiction. If the erosion and sedimentation controls specified by the authorities having jurisdiction are more stringent than those specified in the Contract Documents, contact the Director's Representative.
 1. Inspect, maintain, and repair erosion and sedimentation control measures during construction until permanent vegetation has been established.

2. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 EXISTING UTILITIES

- A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
 1. Arrange with utility companies to shut off indicated utilities as necessary
- B. Interrupting Existing Utilities: Do not interrupt utilities serving occupied facilities unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 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.

3.4 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
 1. Do not remove trees, shrubs, and other vegetation indicated to remain.
- B. Fill depressions caused by clearing and grubbing operations with suitable material unless further excavation or earthwork is indicated.
 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to specified density.

3.5 TOPSOIL STRIPPING

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil to depth of a minimum of 4 inches in a manner to prevent intermingling with underlying soil or other waste materials.
 1. Remove subsurface soil and non-soil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsurface soil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 1. Limit height of topsoil stockpiles to 120 inches.

2. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

3.6 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated suitable materials away from the edge of excavations and without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 1. Limit height of soil stockpiles to 180 inches.
 2. Dispose of surplus soils. Surplus soil is that which exceeds quantity indicated to be stockpiled or reused.

3.7 DEWATERING

- A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
- B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- C. Protect subgrades from rain or water accumulation that can cause softening, undermining/undercutting, washout, damage, and other soil changes that would be detrimental to the stability of subgrades.
 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
- D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.8 EXCAVATION, GENERAL

- A. Unclassified Earth Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
 1. If excavated materials intended for fill and backfill include unsuitable materials and rock, replace with suitable materials.
 2. Earth excavation includes excavating pavements and obstructions visible on surface; underground structures, utilities, and other items indicated to be removed; and soil, boulders, and other materials not classified as rock or unauthorized excavation.
 - a. Intermittent drilling; blasting, if permitted; ram hammering; or ripping of material not classified as rock excavation is earth excavation.

3.9 EXCAVATION

- A. Excavation for Structures: Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
- B. Excavations for Footings and Foundations:
 - 1. Do not disturb bottom of excavation when concrete is to bear on undisturbed soil. Excavate by hand to final foundation bearing grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
 - 2. Where concrete is to bear entirely on existing rock, remove loose soil and loose rock and place concrete to required lines and grades.
 - 3. Where concrete is to bear partially on rock and partially on soil, immediately notify the Director's Representative before any backfilling or concrete placement occurs; the Director's Representative will determine the correct foundation treatment for the Work.
- C. Excavation for Electrical utility structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.
- D. Excavation for Slabs: Excavate to the following depths below bottom of concrete for addition of Crushed Stone Material:
 - 1. Exterior Slabs: 12 inches, unless otherwise indicated.
- E. Excavation for Pavements: Excavate surfaces under pavements to indicated lines, cross sections, elevations, and subgrades.
- F. Excavation for Utility Trenches: Excavate trenches to indicated gradients, lines, depths, and elevations.
 - 1. Trench Width: Excavate trenches to uniform widths to provide 12 inches of clearance on each side of pipe or conduit.
 - 2. Trench Bottoms: Excavate trenches 6 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells and coupling joints of pipe.

3.10 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations, wall footings, and retaining walls with Select Granular Material without altering top elevation of footing, foundation, or wall.
 - 1. Unauthorized excavations under structural work shall be reported to the Director's Representative immediately before any backfilling or concrete work commences.
- B. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavation of the same classification, unless otherwise directed by the Director's Representative.

3.11 SUBGRADE INSPECTION

- A. Notify Director's Representative when excavations have reached required subgrade and are ready for inspection.
- B. If Director's Representative determines that unsuitable material is present or that there are soft spots or areas of excessive pumping or rutting, excavate and replace with compacted backfill or fill material as directed.
 - 1. Have cross section taken, under the supervision of an independent land surveyor, to determine volume of additional excavations.
- 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 temperatures, frost, rain, accumulated water, or construction activities, as directed by the Director's Representative, without additional compensation.

3.12 BACKFILL & SOIL FILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
 - 2. Surveying locations of underground utilities for Record Documents.
 - 3. Acceptance by the Director's Representative of construction below finish grade.
- B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- C. Place fill and backfill on subgrades free of mud, frost, snow, or ice.
- D. Place fill and backfill materials in layers not more than eight inches thick in loose depth, unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the specified density.
 - 1. Place fill and backfill against foundation walls and in confined areas such as trenches not easily accessible by larger compaction equipment in maximum 6-inch-thick loose depth layers.
 - 2. For large fill and backfill areas, the layer thickness may be modified by the Director's Representative, at the Contractor's written request, if in the Director's Representative's judgment, the equipment used is capable of compacting the fill material in a greater layer thickness. This request will include the type and specifications of compaction equipment intended for use.
 - 3. For Open Graded Stone (No. 1 crushed stone, No. 2 crushed stone, No. 57 crushed stone, etc.) in excess of six inches: Material must be wrapped in separation fabric.
 - 4. Clean Stone: 1 inch particle size to be used as backfill for handhole installation.
- E. Under Exterior Concrete Slabs:

1. Up to Subgrade Surface Elevation: Place Selected Fill when fill or backfill is required.
2. Subbase Material: Place 24 inches of No. 57 crushed stone over subgrade surface.

F. Under Pavements:

1. Up to Subgrade Surface Elevation: Place Selected Fill when fill or backfill is required.
2. Subbase Material: Place as indicated.

G. Landscaped Areas: Place Suitable Material when required to complete fill or backfill areas up to subgrade surface elevation. Do not use material containing particles over four inches in diameter within the top 12 inches of suitable material.

H. Utility Trench Backfill

1. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
2. Backfill voids with suitable material while removing shoring and bracing.
3. Initial Backfill:
 - a. Soil Backfill: Place and compact initial backfill of Cushion Material to a minimum depth of 4 inches below the bottom, 6 inches to the sides, and to a height of 6 inches over the pipe or conduit.
 - 1) Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit.
4. Coordinate backfilling with utilities testing.
5. Final Backfill:
 - a. Soil Backfill: Place and compact final backfill of Selected Fill soil to final subgrade elevation.

I. Backfilling Excavation Resulting From Removal of Unsuitable Material:

1. Up to Subgrade Surface Elevation: Place Select Granular Material when backfill is needed unless otherwise specified by the Directors Representative.

J. Crushed Stone Areas Around Concrete Pads: Provide 6 inches minimum thickness of crushed stone around concrete pads extending to limits indicated.

3.13 SOIL MOISTURE CONTROL

- A. Where fill or backfill must be moisture conditioned before compaction, uniformly apply water to the surface and to each layer of fill or backfill to within **2 percent** of optimum moisture content.
- B. Prevent ponding or other free water on 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. Soil that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until moisture content is reduced to a value which will permit compaction to the percentage of maximum density specified.
- D. When the existing ground surface to be compacted has a density less than that specified for the particular area classification, break up and pulverize, and moisture condition to facilitate compaction to the required percentage of maximum density.

3.14 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Compact soil materials to not less than the following percentages of maximum density according to ASTM D1557 for the following:
 - 1. Under structures: 95 percent.
 - 2. Under concrete slabs, steps, and pavements: 95 percent.
 - 3. Under landscaped areas, turf, or unpaved areas: 90 percent.
 - 4. Pipe bedding: 95 percent.

3.15 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
- B. Subgrade Surface for Pavement
 - 1. Shape and grade subgrade surface as follows:
 - a. Pavements: Shape the surface of areas under pavement to required line, grade and cross section, with the finish surface not more than 1/2 inch above or below the required subgrade surface elevation.
 - 2. Grade Control: During construction, maintain lines and grades including crown and cross-slope of subbase course.
 - 3. Thoroughly compact subgrade surface for pavement by mechanical rolling, tamping, or with vibratory equipment as approved to the density specified.
- C. Finish Grading:
 - 1. Grade and compact to smooth finished surface within tolerances specified, and to uniform levels or slopes between points where finish elevations are indicated or between such points and existing finished grade.
 - 2. Finish surfaces free from irregular surface changes, and as follows:
 - a. Pavements: Place and compact subbase material as specified. Shape surface of areas under pavement to required line, grade and cross section, with the finish surface not more than 1/4 inch above or below the required subbase elevation.

3. Spread topsoil directly upon prepared subgrade surface to a depth measuring 4 inches after natural settlement of the topsoil has occurred in areas to be seeded or to receive sod. Perform topsoil spreading operations only during dry weather. Place to greater depth when necessary to adjust grades to required elevations.
 - a. Approved existing topsoil within the Grading Limit Line may be used. Provide additional topsoil from outside sources as required.
4. Finish topsoil surface free of depressions that would trap water, free of stones over 1 inch in any dimension, and free of debris or other objectionable material. Finished surfaces shall conform to the contour lines and elevations indicated on the drawings or as directed by the Director's Representative.

3.16 FIELD QUALITY CONTROL

- A. Special Inspections: Director's Representative will engage a qualified Special Inspector to perform the following special inspections:
 1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
 2. Determine that fill material classification and maximum lift thickness comply with requirements.
 3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Director's Representative will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Coordinate with and allow testing agency to inspect and test subgrades and each fill or backfill layer; provide testing agency minimum three working days advanced notice prior to all phases of filling and backfilling operations. Proceed with subsequent earthwork activities only after test results for previously completed work comply with requirements.
- D. Testing agency will test compaction of soils in place according to ASTM D1557, as applicable. Tests will be performed at the following locations and frequencies:
 1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
 2. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length but no fewer than two tests.
- E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
 - 1. Scarify or remove and replace soil material to depth as directed by Director's Representative; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
 - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove from State property and dispose of excess and unsuitable materials, including materials resulting from clearing, grubbing and removal of existing improvements; soil; trash; and debris.

END OF SECTION 310000

SECTION 321723 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Painted markings applied to asphalt paving.
2. Surface sealant applied to asphalt paving prior to striping.

1.2 REFERENCES

A. United States Department of Justice (US DOJ)

1. Americans with Disabilities Act (ADA), Standards for Accessible Design

B. Building Code of New York State Chapter 11 - Accessibility

C. New York State Department of Transportation (NYS DOT) Standard Specifications

1. Section 640 –Reflectorized Pavement Marking Paints

1.3 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: Include technical data and tested physical and performance properties.

E. Samples:

1. For each exposed product and for each color and texture specified; on rigid backing, 8 inches square.

F. Quality Assurance:

1. Certification: Affidavit by the paint applicator, certifying that the materials comply with the current regulatory requirements in effect at the time products were delivered and applied.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of NYS Department of Transportation Standards and Specifications for pavement-marking work.
 - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F.

PART 2 - PRODUCTS

2.1 PAVEMENT MARKINGS

- A. Paint: DOT Section 640-2, white paint. Delete reference to Glass Beads.
- B. Source Limitations: Obtain pavement-marking paints from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the latest edition of the Building Code of New York State, Chapter 11.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that pavement-marking substrate is dry and in suitable condition to begin pavement marking in accordance with manufacturer's written instructions.
- B. Remove dust, dirt, and other foreign material detrimental to paint adhesion.
- C. Mark layout of stripes and lines with chalk or paint.
- D. Proceed with pavement marking only after unsatisfactory conditions have been corrected.

3.2 PAVEMENT MARKING

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified by the Director's Representative.
- B. Prior to applying pavement markings, apply asphalt surface sealant to all areas within the limit of disturbance, as indicated on the drawings. Allow sealant to fully cure in accordance with manufacturer's recommendations before proceeding with striping.
 - 1. Allow asphalt paving or concrete surfaces to age for the minimum duration recommended by the pavement marking manufacturer before starting pavement marking.
- A. Apply paint in accordance with DOT Section 640-3.02, except as follows:
 - 1. Delete references to Glass Beads.
 - 2. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to asphalt paving or concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.

3.3 PROTECTING AND CLEANING

- A. Protect pavement markings from damage and wear during remainder of construction period.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 321723