

**METRIC**

**D260298**

**F.A. PROJECT**

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# **PROPOSAL**

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Submitted in accordance with Standard  
Specifications officially adopted  
January 2, 2002 and the Highway Law.

**Letting of November 30, 2006  
10:30 A.M.**

## **Book 5 of 7**

50 WOLF ROAD  
ALBANY, NEW YORK 12232

NEW YORK STATE DEPARTMENT OF TRANSPORTATION





**ITEM 03615.60 M - OPTIONAL TYPE STAIR RAILING**

**DESCRIPTION** The Contractor shall fabricate, furnish and install an aluminum or stainless steel stair railings in accordance with the contract plans at the locations specified and as directed by the Engineer-in-Charge.

**MATERIALS:** Aluminum post and rail shall be Alloy 6063-T52 and Alloy 6063-T832, 40 mm outside diameter schedule 40 pipe with a mill finish.

Steel post and rails shall be type 304 Schedule 5 - Ornamental Grade 40 mm outside diameter stainless steel pipe with Number 4 polished finish.

Brackets, connector sleeves, tees, elbows and anchorage flange shall be of the same material as post and rail option selected.

Anchor Bolts: 710-23

Sleeve Anchor Units: When specified shall be as specified on the plans or as approved.

**CONSTRUCTION DETAILS:** Railing assemblies shall be fabricated to the shapes and dimensions shown on the contract drawings using appropriate brackets, connecting sleeves, tees, elbows, anchorage flanges and appropriate lengths of pipe as specified for post and rails to assemble railings in accordance with the manufacturer's specifications and fabrication details. A copy of the manufacturing specifications and fabrication details shall be furnished to the Engineer and the fabricator shall certify that all materials and workmanship are in compliance with the manufacturer's specifications and fabrication details for the type of railing selected.

Railing anchors shall be provided as approved when step units and landings are poured in place.

Railing sections shall be set such that all vertical members are plumb.

**METHOD OF MEASUREMENT:** This work shall be measured as the number of meters of railing fabricated and placed in accordance with the plans and to the satisfaction of the Engineer measured along the top of rail to the pay limits shown on the plans. Measurements will be made to the nearest tenth of a meter of rail.

**BASIS OF PAYMENT:** The unit price bid shall include all materials in conformance with the specification, equipment and labor necessary to complete the work as specified and to the satisfaction of the Engineer-in-Charge.

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ITEM 615.60000711 M – Curb Gate Valve 2 NPS  
ITEM 615.60000811 M – Cast Iron Valve Box, 5.25 NPS  
ITEM 615.60000911 M – 2 NPS Copper Water Service Pipe  
ITEM 615.60001011 M – Water Meter with Remote Reading Device – 1 NPS  
ITEM 615.60001111 M – 2 NPS Backflow Preventer with Chamber  
ITEM 615.60001211 M – Precast Concrete Pit for Water Meter  
ITEM 615.60001311 M – Irrigation Booster Pump/Fertigation System  
ITEM 615.60001411 M – Power Supply to Booster Pump and Irrigation Controller  
ITEM 615.60001511 M – Irrigation Controller with Rain Sensor and Maintenance Radio  
ITEM 615.60001611 M – Irrigation 2-Wire Path and Conduit  
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ITEM 615.60001811 M – Sleeves  
ITEM 615.60001911 M – Mainline Pipe and Fittings  
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ITEM 615.60002111 M – Isolation Valve Assembly  
ITEM 615.60002211 M – Automatic Valve Assembly – Drip Irrigation  
ITEM 615.60002311 M – Automatic Valve Assembly – Lawn  
ITEM 615.60002411 M – Quick-Coupling Valve with Chamber  
ITEM 615.60002511 M – Lawn Sprinkler with Swing Joints  
ITEM 615.60002611 M – Drip Irrigation Tubing  
ITEM 615.60002711 M – Line Flushing Valve  
ITEM 615.60002811 M – Tree Drip Rings and Fittings

#### DESCRIPTION

Under these items, the Contractor shall furnish and install irrigation equipment to provide in-ground and drip irrigation systems for all plant material, in accordance with the plans, specifications, and directions of the Engineer and Route 9A Landscape Architect. Work under these items includes, but is not necessarily limited to, the following:

- 1) Preparing Irrigation Shop Drawings
- 2) Securing Permits and Paying Related Fees
- 3) Trenching, Excavating, and Backfilling for the entire Irrigation System
- 4) Installing fully operational Irrigation System
- 5) Testing all Irrigation System components to verify proper operation
- 6) Providing “As-Built” Drawings and Irrigation System Operations Manual

Permits and Fees: The Contractor shall obtain all permits and pay required fees to any governmental agency having jurisdiction over the work, at no additional cost to the State. Contractor shall arrange for all inspections required by local ordinances during the course of construction. On completion of the work, satisfactory evidence shall be furnished by the Contractor to show that all work has been installed in accordance with the local ordinances and code requirements to the satisfaction of the Route 9A Landscape Architect.

Approval: Where the terms “approve”, “approval”, “approved”, or “approved equal” are used in the specifications, they shall mean the approval of the Route 9A Landscape Architect in writing.

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**Pre-Installation Conference:** Before any work is started, a conference shall be held between the Contractor, Irrigation Subcontractor, Engineer and the Route 9A Landscape Architect concerning the work to be performed under these items.

**Coordination:** Contractor shall coordinate, and cooperate with all other Contractors on site to enable the work to proceed as efficiently as possible. Contractor shall coordinate all aspects of irrigation system installation with all other utility installations.

**Inspection of Site:** Contractor shall perform site survey, research public utility records, and verify existing utility locations. Should utilities not shown on the plans interfering with the work be found during excavation, Contractor shall promptly notify the Engineer for instructions as to further action. The Contractor is liable for damage to any existing utilities encountered on the site.

**Site Information:** Reports on subsurface condition investigations to the project area were made during design of the Project and are available for informational purposes only; data in reports are not intended as warranties of accuracy or continuity of conditions (between soil borings). The State assumes no responsibility for interpretations or conclusions drawn from this information.

The Contractor shall take all necessary precautions to protect the existing facilities to remain. Should damage be incurred, the Contractor shall repair the damage to its original condition at no additional cost to the State.

**Existing Plant Material and Site Conditions:** The Contractor shall take all necessary precautions to protect existing plant material and site conditions. Should damage be incurred, the Contractor shall repair the damage to its original condition at no additional cost to the State.

**Rejection:** The State reserves the right to reject any material or work that does not conform to the Contract Documents. Rejected work shall be removed or corrected at no cost to the State.

**Work Schedule:** Within twenty (20) calendar days after award of the Contract, the Contractor shall submit to the Engineer a work schedule.

**Guarantee:** All work shall be guaranteed for one year from date of acceptance against all defects in material, equipment and workmanship. Guarantee shall also cover repair of damage to any part of the premises, including all plant material resulting from leaks or other defects in material, equipment and workmanship to the satisfaction of the Engineer. Repairs, if required, shall be performed promptly, at no cost to the State.

During construction the Contractor shall be responsible for the winterization of the system in the Fall (Autumn) and start-up of the system in the Spring. Additionally, once the system is completed, the Contractor shall be responsible for the winterization of the system in the Fall and start-up of the system the Spring for the first year after acceptance of the system by the State.

**Construction Record Drawings:** The Contractor shall prepare "Construction Record" drawings on a mylar reproducible or disc which will show deviations from the bid documents made during construction affecting the main line pipe, controller locations, remote control valves, quick-coupling valves, and all

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sprinkler heads. The drawing shall also indicate and show approved substitutions of size, material and manufacturer's name and catalog number. The drawings shall be delivered to the State before final acceptance of the work.

**Irrigation System Operations Manual:** Contractor shall also provide a complete **Irrigation System Operations Manual**, including manufacturer's specifications, catalog cuts, and technical data for all irrigation equipment installed in the irrigation system. Should more than one system be installed, "As-Built" Drawings and **Irrigation System Operations Manuals** are required for each system and shall be delivered to the State before final acceptance of the work.

**DEFINITIONS**

The following are irrigation industry standard abbreviations for plastic materials used in the Irrigation System:

PVC: Polyvinyl chloride plastic.

PE: Polyethylene Plastic

HDPE: High Density Polyethylene Plastic

**SYSTEM PERFORMANCE REQUIREMENTS:**

**Minimum Water Coverage:** 100 (%) percent of all turf and planting areas shall receive 100 (%) percent water coverage.

**Location of Sprinklers and Specialties:** Design location as shown in plans is approximate. Contractor shall make minor adjustments as necessary to avoid conflicts with existing plantings and obstructions such as signs and light standards and to achieve 100 (%) percent coverage to the approval of the Route 9A Landscape Architect.

**Working Pressures:** The operating pressure requirement for the irrigation system is 300 Lpm at 0.50 mPa.

**SUBMITTALS:**

The Contractor shall submit the following to the Route 9A Landscape Architect for review and approval prior to ordering materials:

**Qualifications:** Irrigation Installation Contractor shall have at least five years of successful installation experience on projects with water distribution work similar to that required for the Project to the satisfaction of the Route 9A Landscape Architect. The work of this section shall be performed by a firm of established reputation which is regularly engaged in and which maintains a regular force of workmen skilled in the installation of the type of work specified in this section.

At the time of bid proposal, the Contractor shall submit to the State a list of several comparable irrigation projects that have been completed by the proposed Irrigation Installation Contractor within the past five years. Contractor shall list project names and locations, names of the owners, their telephone numbers

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and dates on which the work on each project was started and completed.

**Shop Drawings:** Contractor shall submit six paper copies of shop drawings. These shop drawings should include all information that either differs from or supplements shown on the Contract Drawings.

**Catalog Cuts:** Contractor shall submit six copies of all Catalog Cuts of the irrigation materials, valves, valve boxes and all connected piping to the Engineer and must obtain written approval from the Engineer prior to installation.

**Technical Product Data:** Shall include pressure rating, rated capacity, settings, and electrical data of selected models for the following irrigation materials:

- Curb Gate Valve
- Cat Iron Valve Box
- Water Meter with Remote Reading Device
- Backflow Preventer with Chamber
- Irrigation Booster Pump/Fertigation System
- Power Supply to Booster Pump
- Irrigation Controller - Include wiring diagrams.
- Rain Sensor
- Maintenance Radio
- Irrigation Wiring and Conduit
- Piping and Fittings
- Valve boxes
- Junction-Boxes
- Valve Assemblies
- Sprinklers Heads
- Specialties - Include emitters, drip tubing, and other devices.
- Line Flushing Valves
- Quick-Coupling Valve
- Tree Drip Rings and Fittings

**Coordination Drawings:** Show piping and major system components. Indicate interface and spatial relationship between piping, system components, adjacent utilities and proximate structures.

**Shop Drawings:** Contractor shall show drip irrigation layout of each planting bed. Contractor shall include valve locations, lateral pipe and drip tube.

**Test Reports:** Contractor shall provide written reports of system testing by local jurisdictional representatives to the Engineer. Reports shall show compliance with all relevant local ordinances and codes.

**Construction Record Drawings:**

1. Contractor shall submit one (1) set of 'Construction Record Drawings for Irrigation System' drawings (created in Microstation J, according to NYSDOT Standards) showing all components of

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actual completed construction. 'Construction Record Drawings for Irrigation System' shall be created from work progress sheets that will be legibly marked as work proceeds. Drawings shall indicate horizontal and vertical locations referenced to permanent surface improvements, identify field changes in dimension and detail, and all changes made as a result of Change Orders and/or by field directives of the Engineer. The work progress sheets shall be kept on-site and be available for review and ongoing/final approval by the Route 9A Landscape Architect. 'Construction Record Drawings for Irrigation System' shall be plotted at a drawing scale of 1:250 (metric) on mylar transparencies, at three (3) mil thickness suitable for reproduction.

2. Contractor shall also submit 'Construction Record Drawings for Irrigation System' as digital drawing files in CD-ROM format.

Contractor shall submit "Construction Record Drawings for Irrigation System" prior to final review and punch list to be done by Route 9A Landscape Architect.

**Irrigation System Operations Manual:** Contractor shall submit two (2) Irrigation System Operations Manuals in hardcopy describing the full operation, care and maintenance of the entire Irrigation System. Contractor shall index the Irrigation System Operations Manual in proper functional order. Contractor shall also submit one (1) copy of Operations Manual on CD-ROM to the Engineer.

**QUALITY ASSURANCE**

Contractor shall assure that all materials used in the Irrigation System meet the following established quality standards to the satisfaction of the Engineer.

1. Electrical Components, Devices, and Accessories shall be listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.
2. Comply with New York City DEP requirements for the prevention of backflow and back siphonage of Irrigation System water into municipal water system.
3. Comply with ASTM F 645, "Guide for Selection, Design, and Installation of Thermoplastic Water Pressure Piping Systems."
4. Comply with NFPA 70, "National Electrical Code," for electrical connections between wiring and electrically operated devices.

**DELIVERY, STORAGE, AND HANDLING**

Contractor shall comply with the following to the satisfaction of the Engineer:

1. Deliver the irrigation system components in the manufacturer's original undamaged and unopened containers with labels intact and legible.
2. Deliver piping in bundles with factory-applied end caps to provide adequate protection of pipe ends, both threaded and plain. Maintain end caps through shipping, storage, and handling to prevent pipe-

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end damage and to prevent entrance of dirt, debris, and moisture.

3. Protect stored piping from moisture and dirt. Elevate stored piping above grade.
4. Store plastic piping so that it is protected from direct sunlight. Support piping to prevent sagging and bending.
5. Protect flanges, fittings, and specialties from moisture and soil.
6. Provide secure, locked storage for valves, sprinkler heads, and similar components.
7. Protect all materials from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off ground or pavement in watertight enclosures when outdoor storage is necessary.

**ACCESSORY MATERIALS**

Contractor shall furnish extra accessory materials described below which match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Contractor shall deliver extra materials to the Engineer.

Valve Keys: Furnish quantity of tee-handle units equal to 25 percent (%) of amount of each type of key-operated, control valve installed.

Quick-Coupler Hose Swivels: Furnish four (4) units of each type of quick coupler installed.

Quick-Coupler Operating Keys: furnish four (4) units of each type of quick coupler installed.

Drainage Stone: shall be 12.7 mm sized, washed, crushed stone.

Geotextile Fabric: at valve boxes shall be a non-woven, spun bound, polyester fabric such as Mirafi 140N, Amoco ProPex 4506, Carthage Mills FX40-HS or approved equal.

**MANUFACTURERS**

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

Ametek, Plymouth Products Division; Sheboygan, Wisconsin.

Amiad Filtration Systems; Oxnard, California

Apollo Ball Valve; Pageland, South Carolina.

Bingham and Taylor

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Carson/Brooks Products; Flora, Mississippi

Dura Plastic Products; Beaumont, California

Hunter Industries; San Marcos, California

IPEX Inc.; Beverly, Massachusetts

Lasco Industries; Anaheim, California

King Bros. Industries; Valencia, California

Netafim Irrigation; Fresno, California

Nibco Inc.; Elkhart, Indiana

Paige Electric Corp.; Union, New Jersey

Phillips Driscopipe Inc.; Richardson, Texas

Quazite

Rainbird; Glendora, California

Scotchlok, Inc

Stockham, Inc

Spears, Sylmar, California

The Toro Company; Riverside, California

Tripp Lite;

Tucor, Inc.

Tytewadd Power Filter

Watertronics, Hartland; Wisconsin

3M Corporation, Electrical Products Division/3M Center; St. Paul, Minnesota

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**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued****MATERIALS**

For proper coordination of materials used in the irrigation system, all materials shall be purchased from the same supply source, although not necessarily the material of a single manufacturer. All materials shall be approved by the Route 9A Landscape Architect.

**2 NPS WET TAP:**

All materials necessary for the installation of the tap will be furnished by the D.E.P. and shall be paid for by the Contractor.

**CURB GATE VALVE 2 NPS:**

Valves: shall be Stockham No. B-130 with bronze body, bronze bonnet, inside screw, non-rising stem, solid wedge disk, and threaded ends, or approved equal.

Operating Key: an approved operating key of proper size for each valve shall be furnished by the Contractor. However, the Contractor need not furnish more than two (2) keys for each type of valve, regardless of the quantity of valves called for in the Contract. For valves 2 NPS, the operating key shall be Stockham No. 1V437, or approved equal. For valves 1 NPS to 1.5 NPS, handwheel operator is to remain.

**CAST IRON VALVE BOX, 5.25 NPS:**

Box: 5.25 NPS valve boxes shall be Bingham & Taylor Fig. No. 4908 with a Fig No. 4904-L locking cover, or approved equal. The cover shall have the designation "WATER" cast thereon. The boxes shall extend within the limits called for on the plans.

Brick: The brick shall be made from clay or shale, well burned, meeting the requirements of §704-01. The mortar shall be composed of one part Portland Cement and two parts sand.

Broken Stone: The broken stone shall be clean broken traprock, or other approved stone, all of which shall pass a 25 mm square opening screen and retained on a 16 mm square opening screen.

**2 NPS COPPER WATER SERVICE PIPE:**

Pipe: The water service pipe shall be rigid hard temper type "k" copper tubing in straight lengths meeting the specification for ASTM designation No. B88.

Fittings: Fittings shall be approved wrought copper and bronze solder - joint pressure fittings (ANSI B 16.22), Di-Electric fittings as required.

Joints: Joints shall be made by soldering, using 95-5 tin antimony solder. From the curb valve to the water tap, joints shall be of the "flared" type.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued****WATER METER WITH REMOTE READING DEVICE-1 NPS:**

1. Provide 4 NPS water meter Neptune Trident Turbine meter, or approved equal, with cast bronze main case and cover, test tee, and 2 NPS test tee valve. Meters shall have flanged ends. Remote reading water meter reading system shall be Neptune ARB V type, or approved equal.

Water meter enclosures, castings and sleeves shall be in accordance with New York City Department of Environmental Protection "Rules and Regulations Governing and Restricting the Use and Supply of Water" and as may otherwise be indicated or specified. Water meters shall consist of a bronze maincase with the serial number stamped on the maincase. Only displacement meters of the flat nutating disc type will be accepted for improved operation. The size, capacity and meter lengths shall be as specified in AWWA Standard C700, latest revision. The maximum number of disc nutations is not to exceed those specified in AWWA C700 latest revision to minimize premature wear.

2. Meter Maincase: All 1 NPS meter maincase shall be the removable bottom cap type with the bottom cap secured by six (6) bolts. Bottom caps shall be interchangeable, size for size, between frost-protected synthetic polymer or cast iron and non-frost protected (bronze) models. No meters utilizing frost plugs will be accepted. Non-frost protected meters shall have bronze or synthetic polymer bottom caps. The cross section of the bottom shall break clean when subjected to freezing pressure of 4.14-5.86 MPa. All maincase bolts shall be of 300 series stainless steel to prevent corrosion. Bottom cap bolt lugs shall be enclosed in the maincase and shall not have externally exposed, threaded through holes.
3. The encoder register shall be installed on meter as per manufacturer's instructions. The remote reading receptacle shall be mounted in a location approved by the State. The register shall be of the straight reading sealed magnetic drive type and shall contain six (6) numeral wheels. Registers must be sealed and dry. All direct reading register lenses shall be flat, of high strength, and impact resistant glass to prevent breakage. The dial shall be of the center sweep pointer type and shall contain 100 equally divided graduations at its periphery. The register must contain a low flow indicator with a 1:1 disc nutating ratio to provide leak detection. Register boxes shall be bronze.

All meters must be adaptable to digital encoder register without interruption of the customer's service for the purpose of pit, remote, or central meter reading. The registers shall be secured to the maincase by means of a plastic tamperproof seal pin to allow for in-line service replacement. Seal screws are not acceptable.

Register retainer rings shall have an impact resistant design which absorbs register glass lens impact. All registers shall have the size, model, and date of manufacture stamped on the dial plate.

4. Measuring Chamber: The measuring chamber shall be a nutating disc type, the flat nutating disc shall be molded of a non-hydrolyzing hard rubber or synthetic polymer and shall contain a type

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316 stainless steel spindle. The nutating disc shall be equipped with a synthetic polymer thrust roller with a stainless steel shaft located within the disc slot. The roller head shall roll on the buttressed track provided by the diaphragm in the measuring chamber. The measuring chamber shall be of a 2-piece snap-joint type. The measuring chamber shall be made of non-hydrolyzing synthetic polymer, shall be smoothly and accurately machined and shall contain a removable molded diaphragm of the same material as that of the chamber. No screws shall be used to secure the chamber together. The control block shall be the same material as the measuring chamber and be mounted on the chamber top to provide sand ring protection. The control block assembly shall be removable to facilitate repairing. Control block assemblies shall be designed to allow no magnetic slippage which would result in a loss of revenue. The measuring chamber outlet port shall be sealed to the maincase outlet port by means of an "O" Ring gasket to eliminate chamber leak paths.

5. **Guarantee:** Registers must be guaranteed for at least ten years. All meters will be guaranteed for one year on material and workmanship. To ensure accuracy, each meter must be accompanied by a factory test tag certifying the accuracy at the flows required by AWWA C700 (low, intermediate, and full flow). All meters shall be guaranteed adaptable to the Neptune ARB Encoder Electronic Meter Reading Systems.
6. **Strainer:** All meters shall contain removable polypropylene plastic strainer screens. The strainer shall be located near the inlet maincase port, before the measuring chamber and control block assembly.
7. **Remote Reader:** The Remote Reader shall be Neptune Proread ARB System ® as manufactured by Schlumberger Industries Water Division (860) 828-6807 or Remote Meter Read (RMR) System® as manufactured by ABB, or approved equal. The Remote Reader shall be a self-contained encoder register metering system designed to obtain remote simultaneous water meter registration directly from the register odometer. The metering information shall be obtained through a remotely located receptacle using a compatible data capture system. The system shall consist of the Encoder Meter Register and Remotely Mounted Receptacle.

**Encoder Meter Register:** Shall be direct mounted with encoded odometer wheels and digital data stream. Batteries or pulses are not allowed.

**Registration:** The register shall provide a six digit visual registration at the meter. The unit shall, in a digital format, simultaneously encode the four or six most significant digits of the meter reading for transmission through the remotely located receptacle. (The most significant meter registration digits are defined as those digits on the register number wheels that denote the highest recorded values of water consumption.) A quick indexing mechanism shall be employed which shall prevent ambiguous reading. The register shall have a full test sweepband or dial divided into gradients of down to 1/100th of the units of registration. Register test rings shall be available for shop testing. The units of registration shall be in U.S. gallons. These units shall be clearly designated on the face of the register. The month and year of manufacture and other identification information shall appear on the face of the register. The register shall employ a leak

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detection indicator on the dial face. Registers using pulse generation or conversion of pulses to digital output is not permitted. Batteries shall not be required.

8. **Mechanical Construction:** Materials used in the construction of the register shall be compatible with the normal water meter environment and with each other. The unit shall possess a copper bottom and incorporate a rubber O-ring seal. Where indicated, pit set registers must be provided with moisture protection for all internal components when operating under flooded pit conditions. The register and mounting base shall be integral components and should not allow for disassembly. The register shall be attached to the meter case by a bayonet attachment. Fastening screws or nuts shall not be required. A tamperproof plastic seal pin shall be used to secure the register to the main case. No special tools shall be required to remove the register. The register head must swivel 360 degrees without removing the seal pin to facilitate visual reading and ease of wiring. The register shall be removable from the meter without disassembling the meter body and shall permit field installation and/or removal without taking the meter out of service. Provision shall be made in the register for the use of seal wires to further secure the register. Terminal screws must be accessible on the register for transmission wire connection to the remote receptacle or future connections to a telephone system.
9. **Electrical Construction:** The materials employed for contacts and connectors shall inhibit corrosion and shall suffer minimal effect from environmental conditions to which they are exposed. The number wheels used in the register assembly shall be provided with spring-type bifurcated metal contacts to insure a high probability of information transmission.

Connection shall be made to the register by three screw-type terminals, sonically inserted into the register top. Access to the terminals shall be available to all models of register. A port cover shall be provided to cover the terminals after they have been wired. Digitally formatted data transmitted from the register shall incorporate a check sum character to verify correct information transmission and integrity. Data errors shall be indicated by the reading equipment.

10. **Meter Reading Information:** The encoder register shall provide up to six digits of information to the reading equipment. A ten digit identification number shall also be provided with each reading. The utility shall have the option to reprogram the internal register identification number an unlimited number of times. The encoder register must have the capability to provide additional custom information to the reader. This information shall be programmed (and reprogrammed at any time) by the utility. Information on programming the register, equipment needed, and encoder meter reading output shall be provided with each proposal.
11. **Remote Mounted Receptacle:** Remote receptacle shall provide a communication link for the transmission of information from the register.
12. **Mechanical Construction:** Where indicated, a remote receptacle must be provided for attachment to a pit meter lid with another unit also designed for attachment by wall mounting. The materials employed shall be corrosion resistant, resist ultraviolet degradation, unaffected by rain or condensation, and compatible with rugged service and long life. The pit mounted receptacle shall be

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mounted to the water meter access door of the meter concrete structure using two screws to be provided by the utility. The hole sizes to be drilled in the access door shall not exceed 10 mm each. The pit mounted receptacle shall be provided with a minimum length of ten feet of wire connected and sealed at the receptacle without terminal exposure.

13. **Electrical Construction:** The receptacle construction shall incorporate the function of a cable clamp or strain relief. Design of the unit shall be such that it provides for mechanical and electrical connection between the receptacle and interrogation equipment.
14. **Cable:** The connecting cable shall be of the two-wire conductor type in a sheath which shall be abrasion and moisture resistant. Each conductor shall be color coded.
15. Connections shall be made to meter by coupling, union or flange union on both inlet and outlet ends of the meter and bored for sealing with holes not less than 3 mm diameter. Solder connections not permitted.

**2 NPS BACKFLOW PREVENTER WITH ENCLOSURE:**

1. Reduced Pressure Backflow Preventer shall consist of two separately spring loaded "Y" type check valves, a differential pressure relief valve, two shut-off valves, and test cocks for field testing.
2. Backflow Preventer shall be tested and certified under A.S.S.E. No. 1013, AWWA and USC manual. It shall be rated for 1.035 MPa (150 psig) minimum, unless otherwise indicated.
3. Type of Reduced Pressure Backflow Preventer shall be Wilkins Series 575, Watts 909, Febco 825 Series, or approved equal. The RPZ shall meet the requirements of American Society of Sanitary Engineers (ASSE) Standard 1013 & the American Water Works Association (AWWA) Standard Code 506-78.

The RPZ shall consist of two independently operating center guided, spring loaded, "Y" pattern check valves and one hydraulically dependent differential relief valve. Mainline valve body and caps including relief valve body and cover shall be bronze. Check valve and relief valve components shall be constructed so they may be serviced without removing the valve body from the line. Shut-off valves and test cocks shall be full ported resilient seated ball valves.

4. **Meter Outlet Control Valve (MOCV):** The MOCV shall be a Class 125, all bronze gate valve, with non-rising stem and solid disc, with screwed bonnet and threaded ends, such as Stockham Figure B-110, or approved equal. The MOCV shall be capped for testing. For testing the 1 NPS water meter, the first test port on the RPZ may be used.
5. **Electrical Grounding:** For continuity of Electrical Grounding (during RPZ Maintenance) the Contractor is to furnish and install one (1) #2 tinned copper ground conductor and copper alloy ground connectors as per O.Z. Gedney, Type ABG for 1 NPS & 1.5 NPS and CG for 2 NPS pipe or approval equal. Ground work is to be done prior to any painting or insulation if needed.
6. Provide adequate clearance for testing and maintenance.

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7. Use proper drainage provision and provide protection from freezing.
8. Backflow prevention installation shall comply with rules and regulations of Cross-Connection Control Unit, Department of Environmental Protection, City of New York.

**PRECAST CONCRETE PIT FOR WATER METER:**

1. **Precast Concrete Structures:** Enclosure structures for the RPZ's and water meter shall be as manufactured by A.C. Miller Concrete Products Inc., Spring City, PA., or approved equal. The precast concrete shall be well cured, shall be dense, and shall have clean edges.
2. **Concrete:** All concrete shall fulfill the material requirements of Section B, except that compressive strength shall be 34.47 MPa at 28 days. All precast concrete shall have a honed finish. The precast concrete shall be well cured, shall be dense and shall have good edges. The cement and aggregate shall be thoroughly mixed in a proportion of one (1) part Portland Cement to not over six (6) or less than four (4) parts of aggregate. The aggregate fine and course shall conform to ASTM C-33. Aggregate shall be free of all deleterious substances which cause reactivity with oxidized hydrogen sulfides. Aggregate shall be graded to produce a homogeneous concrete mix.
3. **Reinforcement:** Steel bar reinforcement shall conform to all provisions of Section 556 of the Standard NYSDOT Specifications.
4. **Ladder Rungs:** Ladder rungs for each water meter structure shall be constructed of copolymer polypropylene plastic, as manufactured by M.A. Industries, Peachtree City, Ga., or approved equal.
5. **Water Meter Structure Access Door:** Access door shall be .9 m x .75 m size, heavy duty (H20 loading) high security color (brown) anodized aluminum access doors such as JustSet Doors, as manufactured by Pennsylvania Insert Corp., Spring City, PA 19475, or approved equal. Frame shall have integral drain channel, anchor flanges, and neoprene gasket. A 1.5 NPS drain coupling shall be located on the corner of the frame. Operation shall be spring assisted for easy operation. A hold open arm shall automatically lock the door in the 90° position. Hinge shall be heavy forged brass with a stainless steel pin. Door shall be provided with two locks. Lock shall be "Ford" lifter worm lock with waterworks bronze pentagonal bolt type "LL". All hardware shall be zinc or cadmium plated.
6. **Construction Accessories:** Frames shall be 5 mm x 50 mm x 50 mm angle welded with joints ground smooth, after fabrication. Hinges shall be heavy duty and welded to door and frame.
7. **Security Bolts for RPZ Structure:** Security Bolts for RPZ Structure shall be NYC DPR pattern # 83 registration # "116183", Part # H11777155, as manufactured by McGard, contact- Dave Smith, Orchard Park, N.Y. 14127, or approved equal. Threads for security bolts shall be at least one-third (1/3) bolt dia. for proper "bite". Vertical doors shall have two(2) security bolts; 7/16 - 20 x .750.

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Horizontal door for RPZ structure shall have four (4) security bolts; 7/16 - 20 x .750

8. Security bolts for Water Meter Structure Horizontal Door: Security bolts for Water Meter Structure Horizontal Door shall be two (2) pentahead security bolts.

Special Design Criteria For Security Bolts:

1. Bolt must be made from alloy steel, heat treated to 1034.21 MPa tensile strength.
  2. Head of bolt must be selectively hardened to Rc 60 min. to prevent the use of files, hacksaws, and chisels.
  3. Bolt is to be made with either a flat or 120° cone seat as required.
  4. Bolt will be torqued by means of a recessed curvilinear ("Daisy") groove in the top face of bolt head. A special mating key is required to operate in groove for installation and removal of bolt.
  5. Bolts are to be zinc nickel plated in order to meet an ASTM B-368 C.A.S.S. test for 22 hours.
  6. Bolt lengths are to be held to +/- .25 mm
  7. Bolt threads are to be class UNC-2A.
9. Water Piping: Shall be hard temper type 'K' copper tubing meeting the Department of General Services; Division of Municipal Supplies, Dept. of Purchase, Specification No. 32-T-1.64 and ASTM No. B88-1974. Fittings shall be approved wrought copper and bronze solder -joint pressure fittings (ANSI B 16.22).

**IRRIGATION BOOSTER PUMP/FERTIGATION SYSTEM:**

Package Booster Pump Station shall be rated for 283.91 LPM @ 0.31 MPa boost; 7.5 HP, 3600 RPM 460/3/60, model LST-7.5-460-3-2 as manufactured by Watertronics or approved equal

Filter: shall be 3 NPS autoflush wye filter model 38-36 shall be as manufactured by Amiad or approved equal.

Sensor Decoder shall be a fully programmable direct bury decoder that provides a direct interface between the flowmaster controller and field sensor, it maybe programmed to operate with a 4-20 mA, analog or digital input. Sensor decoder shall be model SD-100 as manufactured by Tucor, Inc. or approved equal

Pump Decoder shall interface between the 2-wire path and booster pump motor start relay coil. Pump decoder shall be model PD-100 as manufactured by Tucor.

**POWER SUPPLY TO BOOSTER PUMP AND IRRIGATION CONTROLLER:**

Primary Power Surge Protection on the Power Circuit (furnishing power to the power transformer and the central computer equipment) shall be a "Zap Trap" surge arrester. The ZAP TRAP shall be model Z-2, as manufactured by Tyte-wadd Power Filter or approved equal.

**IRRIGATION CONTROLLER WITH RAIN SENSOR AND MAINTENANCE RADIO:**

Controller shall consist of Tucor controller, with internal modem and communication package. The package shall include Remote Monitoring Software, model TWC-RMS and Remote Access software,

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model TWC-RAS or approved equal. The control system shall be model TWC-50(C) Flowmaster Controller, as manufactured by Tucor, Inc or approved equal.

Line Termination Box shall provide for Surge Protection on the 2-Wire Communication wires to prevent surges coming from the field wires back to the controller. In addition to facilitating connection of the 2-Wire Communication wires to the Computer it shall also provide for connection of the Sensor Devices into the system. The line termination box, to the Controller, shall be model LTB-100, as manufactured by Tucor, Inc or approved equal.

Remote Field Access Unit shall provide mobile control of irrigation system. Remote field access unit to consist of hand held radio and centrally located (permanent mount) transceiver. Remote field access unit shall be model RFA-100F, as manufactured by Tucor, Inc or approved equal.

Rain Sensor shall be Mini-Click II, model 502C with sensor guard as manufactured by Hunter or approved equal. Contractor shall make allowance for 30 m of rigid conduit to install the rain sensor.

**IRRIGATION 2-WIRE PATH AND CONDUIT:**

Control Wire: shall be double jacketed two (2) conductor cable specially designed for use with the 2-wire control system, suitable for direct burial. The conductors shall be tin coated, soft drawn, annealed, solid copper conforming to ASTM 33 with 1.5 mm thick PVC (polyvinyl chloride) insulation, conforming to UL Standard #493 for thermoplastic-insulated style UF (Underground Feeder), rated at 60 degree C.

Conduit for Control Wire: shall conform to both the New York City Building Code and the New York City Electrical Code.

Junction Boxes: shall be polymer concrete 280 mm x .5 m x .3 m Quazite # PC1118DG12 flush mounted with heavy duty polymer concrete cover, Quazite #PC1212HG00 Neoprene gasketed and cover logo "Electric," or approved equivalent.

**IRRIGATION 2 –WIRE PATH GROUNDING PACKAGE:**

Field Surge Protector: shall be model SP-100 as manufactured by Tucor, Inc or approved equal.

Ground Rods: shall be 16 mm by 2.5 m copper clad steel rods. Ground rod connectors to be of the Caldwell "one shot" fuse type - Model GR1-161G or GT1-161G or approved equal, as required.

Earth Grounding Wire: (to the ground rods) shall be AWG #6/1 solid bare copper conductor. Ground wire from rod to rod to be AWG #6/1 solid bare copper conductor.

Ground Rod Box: shall be Carson/Brooks 150 mm econo-box, model 708 or approved equal.

**SLEEVES:**

Sleeves: shall be PVC Schedule 40 PE pipe with solvent weld couplings. Pipe shall be manufactured by

**ITEM 615.6000611 M – 2 NPS Wet Tap...Continued**

IPEX Inc, or approved equal.

**MAINLINE PIPE AND FITTINGS:**

**Main Line Piping:** shall be SDR-11 1.10 MPa (Butt Fused) High Density Polyethylene (HDPE) Driscopipe 8600 extruded from Marlex M-8000. The pipe shall be PE 3408 high density, high molecular weight. The pipe shall be in compliance with ASTM F714 dimension and pressure ratings. Primary properties- Cell classification shall be in accordance with ASTM D 3350-84 and 345434C. Pipe shall be manufactured by Phillips Driscopipe Inc. or approved equal.

**Main Line Pipe Fittings:** shall be SDR-11 1.10 MPa (Butt Fused) High Density Polyethylene Plastic (HDPE) Driscopipe 8600 extruded from Marlex M-8000. The fittings shall be PE 3408 high density, high molecular weight. The fittings shall be in compliance with ASTM F714 dimension and pressure ratings. Primary properties- Cell classification shall be in accordance with ASTM D 3350-84 and 345434C. Fittings shall be manufactured by Phillips Driscopipe Inc. or approved equal.

**LATERAL PIPE AND FITTINGS:**

**PVC Lateral Pipe:** shall be polyvinyl chloride (PVC) SDR-21- 1.38 MPa with solvent weld bell end couplings conforming to ASTM-2241. All plastic pipe shall be new and be continuously and permanently marked with manufacturer's name, materials size and schedule or type. Pipe shall be manufactured by IPEX Inc, or approved equal.

**Poly Lateral Pipe:** shall be polyethylene #3408 (POLY) 0.69 MPa Non-NSF SDR-11.5 and conforming to ASTM-2239. All pipe shall be new and be continuously and permanently marked with manufacturer's name, materials size and schedule or type.

**PVC Lateral Line Fittings:** shall be solvent weld Schedule 40 PVC as manufactured by Spears Manufacturing or approved equal.

**Polyethylene Lateral Pipe Fittings:** PVC insert shall be as manufactured by Lasco, or approved equal. Clamps shall be stainless steel with stainless steel screws, Ideal #6800 series, or approved equal.

**PVC Solvent:** shall be compatible with PVC pipe and of proper consistency and shall be approved.

**ISOLATION VALVE ASSEMBLY:**

**Isolation Valves 2.5 NPS and smaller:** shall be screwed bonnet, bronze body, solid-wedge type gate valves with threaded ends, non-rising stems, and shall be rated for a normal operating pressure (cold water) of at least 1.38 MPa. Valve shall be model NIBCO T-113 as manufactured by Nibco or approved equal.

**Isolation Valves: 3 NPS:** shall be iron body, bronze mounted units which meet AWWA specification C509. Isolation Valves shall have a working pressure rating for cold water of at least 1.38 MPa. The valves shall have push-on ends specifically designed for use with PVC pipe. The valves shall be

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equipped with non-rising stems and 2 NPS square cast iron operating nuts. Valves to be series 500 as manufactured by Waterous or approved equal.

Valve Boxes for Main Line Isolation Valves: shall be adjustable .45 m - .60 m telescoping screw type. Adjustable curb box shall be Carson/Brooks as manufactured by Carson- Brooks Products, Inc or approved equal.

Valve Boxes used with Junction Boxes and Valve Assemblies (Paved Areas): shall be .40 m x .65 m x .45 m valve boxes. Valve boxes shall be model #1324- 450 mm with polymer concrete cover and trim ring as manufactured by Carson/Brooks Products, Inc or approved equal.

**AUTOMATIC VALVE ASSEMBLY – DRIP IRRIGATION:**

Valve Boxes used with Drip Irrigation Valve Assemblies: shall be .40 m x .60 m x .45 m valve boxes; black in color. Valve boxes to be model #1324-450 mm with black bolt down T-cover as manufactured by Carson/Brooks Products, Inc or approved equal.

Valve Box Extensions: as required, shall be of the same size, color and manufacturer as the box on which it is used.

Ball Valves: Ball valves shall be bronze body valves with stainless steel plastic covered handle (1.03 MPa rated) with NPT connections. Size shall be the same as the automatic valve it serves. Valves shall be series #70 as manufactured by Apollo Ball Valve or approved equal.

Remote Control Valves: shall be plastic globe type, normally closed, electric solenoid-actuated and diaphragm-operated with flow stem. Solenoid to be epoxy impregnated 24 VAC-60 Hz (18 to 30 VAC), 5.8 VA and to be suitable for direct burial. Valves shall be capable of manual operation by means of either an internal or external bleed. Sizes to be as noted on the drawings. Valves shall be Rainbird PEB series as manufactured by Rainbird or approved equal. Valves with pressure regulation option shall be Rainbird PEB-PRS-B series as manufactured by Rainbird or approved equal.

Automatic Valve Assembly Fittings: Schedule 80 PVC shall be as manufactured by Spears manufacturing or approved equal.

Male Adapters: Schedule 80 PVC shall be as manufactured by Spears manufacturing or approved equal.

PVC Nipples: Schedule 80 PVC with molded threads shall be as manufactured by Spears manufacturing or approved equal. Close nipples will not permitted by Route 9A Landscape Architect.

High Density Polyethelene Plastic Service Saddles: shall be ductile iron with stainless steel straps. Service Saddles shall be series 404 as manufactured by JCM Industries Inc or approved equal.

Line Decoder: shall be a fully programmable direct bury decoder that provides an interface between the flowmaster controller and automatic valve. The output of the decoder shall be 24 VAC. The line decoders shall be model LD-100 as manufactured by Tucor, Inc or approved equal.

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Low voltage (24 VAC) Wire Splice Kits: shall be DBM, U.L. Listed 600 volt as manufactured by Paige Electric or approved equal.

Wire Connectors: 3M – shall be Scotchlok Insulated Connector (Y, R, G, B), or equal- size in accordance to wire AWG used.

**AUTOMATIC VALVE ASSEMBLY – LAWN:**

Valve Boxes used with Automatic Valve Assemblies (Lawn Zones): shall be .30 m x .45 m x .45 m valve boxes; black in color. Valve boxes to be model #1419- 450 mm with black bolt down T-cover as manufactured by Carson/Brooks Products, Inc or approved equal.

Valve Box Extensions: as required, shall be of the same size, color and manufacturer as the box on which it is used.

Ball Valves: Ball valves shall be bronze body valves with stainless steel plastic covered handle (1.03 MPa rated) with NPT connections. Size shall be the same as the automatic valve it serves. Valves shall be series #70 as manufactured by Apollo Ball Valve or approved equal.

Remote Control Valves: shall be plastic globe type, normally closed, electric solenoid-actuated and diaphragm-operated with flow stem. Solenoid to be epoxy impregnated 24 VAC-60 Hz (18 to 30 VAC), 5.8 VA and to be suitable for direct burial. Valves shall be capable of manual operation by means of either an internal or external bleed. Sizes to be as noted on the drawings. Valves shall be Rainbird PEB series as manufactured by Rainbird or approved equal. Valves with pressure regulation option shall be Rainbird PEB-PRS-B series as manufactured by Rainbird or approved equal.

Automatic Valve Assembly Fittings: Schedule 80 PVC shall be as manufactured by Spears manufacturing or approved equal.

Male Adapters: Schedule 80 PVC shall be as manufactured by Spears manufacturing or approved equal.

PVC Nipples: Schedule 80 PVC with molded threads shall be as manufactured by Spears manufacturing or approved equal. Close nipples will not permitted by Route 9A Landscape Architect.

High Density Polyethelene Plastic Service Saddles: shall be ductile iron with stainless steel straps. Service Saddles shall be series 404 as manufactured by JCM Industries Inc or approved equal.

Line Decoder: shall be a fully programmable direct bury decoder that provides an interface between the flowmaster controller and automatic valve. The output of the decoder shall be 24 VAC. The line decoders shall be model LD-100 as manufactured by Tucor, Inc or approved equal.

Low voltage (24 VAC) Wire Splice Kits: shall be DBM, U.L. Listed 600 volt as manufactured by Paige Electric or approved equal.

Wire Connectors: 3M – shall be Scotchlok Insulated Connector (Y, R, G, B), or equal- size in accordance to wire AWG used.

**ITEM 615.6000611 M – 2 NPS Wet Tap...Continued****QUICK-COUPLING VALVE WITH CHAMBER:**

Quick-Coupling Valves: shall be one piece bronze bodies, double slot, 1 NPS IPS with lock top; supply two (2) keys. Valves shall be Rainbird model #5RC or approved equal.

Cast Stone: Manufactured by an approved manufacturer having facilities for furnishing the quality of cast stone required.

All cast stone shall be made of the color and finish to match the approved sample. Cast stone shall have a honed finish. The stone shall be well cured, shall be dense and shall have good edges. The cast stone shall be made of a mixture of one (1) part of white air entraining Portland cement and one (1) part of gray air entraining Portland cement and crushed stone aggregate mixed in the proportions to obtain a mixture of maximum density and a finished product of a color to be approved by the Engineer. The cement and aggregate shall be thoroughly mixed in a proportion of one (1) part Portland cement to not over six (6) or less than four (4) parts of aggregate.

The aggregate shall be made by crushing selected pieces of stone to insure uniform color and texture and shall be screened into at least three sizes the largest of which shall not exceed that which will pass a ring 6.5 mm in diameter; and there shall be at least fifty (50) percent of such size of aggregate that will not pass a 3.0 mm ring. The various sizes shall be used in proportions to give maximum density, all measured by weight.

Cast stone shall have a compressive strength of not less than 200 MPa tested as cubes 50 mm x 50 mm x 50 mm at an age of not more than twenty-eight (28) days and shall have an absorption not to exceed seven (7) percent of the dry weight after being dried to constant weight at 65°C.

No chipped, broken or checked stone will be accepted. Checked stones are those showing fine hair cracks or checks on the surface.

Before starting work, the Contractor shall submit, for approval of the Route 9A Landscape Architect, finished samples of the cast stone the Contractor proposes to use to show the extreme range in color, finish, texture, and quality of the stone. Samples shall be marked with the name of the material, contract number, grade, finish and producer's name. All cast stone used in the work shall be equal to the sample approved by the Route 9A Landscape Architect.

Valve: Quick coupling valve shall be 1 NPS, Skinner Mfg. Co. No. 31, Buckner Mfg. Co. No. 14 LT, or approved equal.

**LAWN SPRINKLER WITH SWING JOINTS:**

Swing Joints for Gear Driven Sprinklers: shall be .75 NPS model T732-100 swing joint kit with double O-ring seals at threaded connections as manufactured by Spears or approved equal.

Swing Joint for Quick Coupling Valves: shall be standard unibody PVC with brass MIPT, PVC snap-loc with brass MIPT, model G13S-212 as manufactured by Lasco Fittings, Inc.

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Gear Driven (Full Circle) Sprinkler: shall be model I-20-36S w/stainless steel riser as manufactured by Hunter Industries or approved equal.

Gear Driven (Part Circle) Sprinkler: shall be model I-20-ADS w/stainless steel riser as manufactured by Hunter Industries or approved equal.

Anti-Theft Sprinkler Device: shall be HEAD-LOK swivels as manufactured by King Brother Industries.

**DRIP IRRIGATION TUBING, FITTINGS AND ACCESSORIES:**

Dripper Line: shall be Techline Tubing, model TLDL6-18, as manufactured by Netafim or approved equal.

Male Adaptor: shall be model TL075MA, as manufactured by Netafim Irrigation or approved equal.

Combination Tee: shall be model TL075FTEE, as manufactured by Netafim Irrigation or approved equal.

Soil Staple: shall be model TLS6, as manufactured by Netafim Irrigation or approved equal

Line Flushing Valve: shall be model TL050MFV-1, as manufactured by Netafim Irrigation or approved equal

Pressure Regulator 1.5 NPS: model PRV150HF40, as manufactured by Netafim Irrigation or approved equal

Pressure Regulator 0.75 NPS: shall be model PRV075HF40, as manufactured by Netafim Irrigation or approved equal.

Filter 1.5 NPS: w/140 Mesh: shall be model DF150-140, as manufactured by Netafim Irrigation or approved equal.

Filter 0.75 NPS mm: w/140 Mesh: shall be model DF075-140, as manufactured by Netafim Irrigation or approved equal.

Air/Vacuum Relief Valve: shall be model TLAVRV, as manufactured by Netafim Irrigation or approved equal.

Insert Fittings: (for use with Techline tubing) shall be as manufactured by Netafim Irrigation or approved equal.

**LINE FLUSHING VALVE ASSEMBLY:**

Line Flushing Valve: All Techline systems shall utilize Netafim Automatic Line Flush Valves at the end of each independent zone area or Dripperline (maximum flow per valve = 57 liters per minute). This

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valve shall be capable of flushing 3.785 liters at the beginning of each irrigation cycle. The valves to be used for the Techline system shall be Model Number TL050MFV (3.785 Liter Flush Valve with 0.5 NPS Male Pipe Thread Connection).

Valve Boxes for Drip Irrigation Flush Valves: shall be 150 mm round valve box. Black in color. Valve boxes shall be Carson/Brooks #708 with snap down T-cover as manufactured by Carson/Brooks Products, Inc or approved equal.

**TREE DRIP RINGS AND FITTINGS:**

Dripperline: The Dripperline shall be manufactured by Techline and shall consist of nominal sized 0.5 NPS low density linear polyethylene tubing, housing internal pressure compensating, self-cleaning, integral drip emitters. The tubing shall be brown in color and conform to an outside diameter (OD) of 17 mm and an inside diameter of 14.5 mm. The emitters shall have the ability to independently regulate.

discharge rates, with an input pressure of 48 kPa to 480 kPa, at a constant flow and with a coefficient of variation (Cv) of .03. Emitters shall have an output of 3.4 liters per hour each utilizing a combination turbulent flow/reduced pressure compensation cell mechanism and a diaphragm to maintain uniform discharge rates. The emitters shall continuously clean themselves while in operation. The dripperline emitter spacing utilized on this project shall be 0.5 meters.

Fittings: All connections shall be made with approved Techline 17 mm insert fittings.

Techline Staples. Irrigation staples shall be Techline Staples, model number TLS6 spaced no more than every 1.5 meters (two per ring minimum) to hold line in place followed by a 50 mm soil layer followed by a 50 mm minimum shredded bark mulch cover.

**CONSTRUCTION DETAILS:****PREPARATION:**

The Contractor shall lay out work as shown on the drawings as accurately as possible. The drawings are generally diagrammatic to the extent that swing-joints, offsets and fittings are not shown. The Contractor shall be responsible for full and complete coverage of all irrigated areas and shall make any necessary minor adjustments as directed by the Engineer.

Work shall include all necessary work, including but not limited to Basic Maintenance and Protection of Traffic, Construction Signs, Flashing Arrow Boards, and Mobilization, for the construction of the Irrigation System. This work shall be performed in accordance with the appropriate sections of the Standard Specifications.

All excavation shall be done by hand where indicated on the plans and/or as directed by the Engineer.

Contractor shall stake all proposed pipe and wire routes, sprinkler, valve and controller locations in accordance with the locations noted on the drawings; provide staking prior to the commencement of work in any area of installation; furnish all supplies, equipment and personnel necessary for the staking of the

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work. Contractor shall obtain the Route 9A Landscape Architect's approval before beginning excavation.

Contractor shall notify the Engineer a minimum of five (5) days prior to the scheduled staking. Contractor shall coordinate irrigation work with planting and lawn areas as to have irrigation available at time of the turf and plant material establishment.

The Contractor is responsible for full and complete coverage of all irrigated areas and shall make any necessary minor adjustments at no additional cost to the State.

The Contractor is responsible for proper drip line placement and adjustment.

Any revision must be submitted and answered in written form by the Landscape Architect.

**Existing Plant Material And Site Conditions:** Contractor shall use extreme care when pipe trench is in close proximity to existing trees. The Contractor shall take necessary precautions to protect existing plant material. Root pruning shall be kept to a minimum and shall be performed by a certified arborist as described in the Supplemental Landscape Specifications. Any existing tree that dies as a result of irrigation installation shall be replaced with new plant material of the same variety and maintained at no additional cost. The Route 9A Landscape Architect shall approve locations of all replanted material prior to completion of pipe installation. Contractor may be required to modify his piping design to accommodate existing locations at no increase in cost to the State.

**Excavating and Trenching:** All surfaces, existing underground installations, etc., damaged or cut as a result of the excavations shall be restored to their original condition in a manner approved by the Route 9A Landscape architect.

Trenches for pipe lines shall be made of sufficient depths to provide minimum cover from finish grade as follows:

- 1) 200 mm minimum cover over lateral supply lines to tree driplines.

**Drip Irrigation Recommended Installation :** The drip irrigation system should be manufactured specifically for this use. The Drip Rings shall be installed below finish grade at a uniform depth, as shown on the drawings.

The Drippers are designed to regulate flow at the specified output from 48 to 480 kPa with a maximum recommended pressure of 310 kPa when using insert fittings (non-clamped).

It is important that all components of the drip system are compatible and it is suggested that the Contractor use materials from a single source.

**Pipe Installation:** Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by manufacturer of the pipe, except where screwed connections are required. Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent with a non-synthetic bristle brush.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued**

Pipe may be assembled and welded on the surface. Snake pipe from side to side of trench bottom to allow for expansion and contraction.

Make all connections between plastic pipe and metal valves or steel pipe with threaded fittings using plastic male adapters and teflon tape.

**Closing Pipe And Flushing Lines:** Cap or plug all openings as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation. Thoroughly flush out all water lines before installing drip rings, flush valves and other hydrants.

**Hydrostatic Testing:** Before backfilling, the entire system shall be hydrostatically tested and inspected. The Contractor shall notify the Engineer in writing at least forty-eight (48) hours in advance of testing. Testing to be accomplished at the expense of the Contractor and in the presence of the Engineer. Center load piping with small amount of backfill to prevent arching or slipping under pressure. Apply a minimum continuous and static water pressure of 690 kPa when welded plastic joints have cured at least twenty-four (24) hours and with the risers capped as follows:

- 1) Main lines and sub-mains to be tested for one (1) hour.
- 2) Lateral lines shall be tested for one (1) hour. (If laterals and individual sub-mains downstream of control valves have less than 620 kPa working pressure or less than 37 liters per minute flow, hydrostatic tests are waived for these laterals).

Leaks detected during tests shall be repaired and the system re-tested to the satisfaction of the Route 9A Landscape Architect.

**Backfill and Compacting:** After system is operating and required tests and inspections have been made, backfill excavations and trenches with clean soil, free of rubbish. Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 90 percent (%) density. Compact trenches in areas to be planted by thoroughly flooding the backfill. Dress off all areas to finish grades.

**Clean Up:** Irrigation Contractor shall remove from the site all debris resulting from work of this section. Job site must be left clean and repaired to the satisfaction of the Route 9A Landscape Architect.

**2 NPS WET TAP:**

The Contractor shall notify the Route 9A Landscape Architect and the D.E.P. three (3) days prior to intended date of work. All sawcutting, excavation, installation of water tap, and restoration of street pavement (where applicable) shall be performed in accordance with D.E.P. and New York City Department of Transportation requirements.

Included under this item, the Contractor shall abandon, disconnect, cap, or plug any existing water service from the existing water main in accordance with the regulations of the Bureau of Water Supply, whether or not the existing service is in approximately the same location as the new water service, wet

**ITEM 615.6000611 M – 2 NPS Wet Tap...Continued**

connection, or water tap.

**CURB GATE VALVE 2 NPS:**

Setting of Valves: Valves shall be set in accordance with Form No. 7 New York City Water Specifications.

Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

Water regulating Valves: Install in vault or above ground between shut off valves,. Install full-size valved bypass.

Relief Valves: Install above ground with shutoff valve on inlet.

Detector Check Valves: Install in vault or above ground.

**CAST IRON VALVE BOX, 5.25 NPS:**

Setting: The valve boxes shall be set plumb, as shown on the plans, on a footing of brick laid in cement mortar, supported on a foundation of broken stone.

**2 NPS COPPER WATER SERVICE PIPE:**

Laying of Pipes: Pipes shall be laid to the required line and grade in accordance with Form No. 6, New York City Water Specifications.

**Connection to Existing Mains:**

Connect to the existing water mains shown on the Drawings or as ordered by the Engineer.

The Contractor shall give Authorities having jurisdiction all requisite notices and shall secure and pay all permits, licenses and certificates relating to this work.

In executing the work, the Contractor shall comply with New York City Water Specifications, Form No. 6, Articles 16 and 19 and with the Rules and Regulations Governing and Restricting the Use and Supply of Water.

Install water-supply piping with shut-off valve in water supply to each ground hydrant and drinking fountain. Use curb valve and service box.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued****WATER METER WITH REMOTE READING DEVICE – 1 NPS:**

Install water meters, piping and specialties according to NYC DEP's written requirements.

Water Meters: Install displacement-type water meters, 2 NPS (DN 50) and smaller, in meter boxes with shutoff valves on water-meter inlets. Include valves on water-meter outlets and valved bypass around meter unless prohibited by authorities having jurisdiction.

Water Meters: Install compound type water meter, 3 NPS (DN 80) and larger, in meter vaults. Included shutoff valves on water meter inlets and outlets and valved bypass around meters. Support meters, valves, and piping on brick or concrete piers. Do not block bottom of meter.

Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shut off valves on water-meter inlets and outlets and full size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

Rough-in piping and specialties for water-meter installation according to utility companys written instructions and requirements.

**2 NPS BACKFLOW PREVENTER WITH ENCLOSURE:**

Install back flow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of NYC DEP, BWS and health department and authorities having jurisdiction.

Do not install backflow preventers with relief drain in vault or other space subject to flooding.

Do not install bypass piping around backflow preventers.

Support 2 NPS (DN 65) and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

**PRECAST CONCRETE PIT FOR WATER METER:**

Setting of Precast Concrete Water Meter Structure: The precast concrete water meter structure shall be set on a 150 mm thickness of broken stone with additional stone added inside the .30 m x .30 m drain sleeve to the top of the bottom slab. The RPZ Structure shall be set on the Water Meter Structure, as shown on NYCDPR Standard Detail Drawing.

The Contractor shall install supports for the water meter at the height shown on the Contract Drawings. The meter shall be set so that the dial faces upward and is horizontal. The dial shall not be more than .9 m above the floor. The encoder register shall be installed on meter as per manufacturer's instructions. The remote reader receptacle shall be installed in the pit cover as per the manufacturer's directions and recommendations, allowing reading of the meter from above ground level. The Contractor to allow

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued**

sufficient Water Meter Remote Reader cable slack for manhole cover removal. The RPZ shall be installed as shown on the Contract Drawings and per manufacturer's instructions.

**Connections:** The Contractor shall connect the water piping as shown on the Contract Drawings for complete and satisfactory operating unit to the satisfaction of the Engineer. Connections shall be made to The Water Meter by coupling union or flange union on both inlet and outlet ends of the meter and bored for sealing with holes not less than 3.175 mm in diameter – solder connections are not permitted. Connections to the RPZ shall be as shown on the Contract Drawings and per manufacturer's instructions.

**IRRIGATION BOOSTER PUMP/FERTIGATION (FERTILIZING IRRIGATION) SYSTEM:**

The Contractor to be responsible for providing all materials, equipment and labor necessary to install all items associated with the packaged pump station.

When discharge piping, electrical connections and electrical inspection have been completed and the irrigation system is capable of delivering one-hundred percent (100%) of the total system demand, the pump station manufacturer is to be contacted for start up. A minimum one (1) week notice to be given to the manufacturer prior to start up date. During start up the complete pumping system to be given a running test of normal start and stop and fully loaded operating conditions. During this test the pump to demonstrate its ability to operate without undue vibration, or overheating and to demonstrate without question its general fitness for service. All defects to be corrected and adjustments made.

After the start up has been completed, but before leaving the job site, a training session will be given. The training session will be given to the Route 9A Landscape Architect to familiarize them with the pumping system operation, maintenance and adjustments.

Contractor to be responsible for all wiring and associated equipment to connect power supply to the booster pump.

All wiring is to be in accordance with all state and local codes.

Install sensor decoder on Watertronics Flow Sensor and connect to the Tucor 2-wire path in accordance with manufacturer's specifications.

Install pump decoder to Watertronics Booster Pump relay and to Tucor 2-wire path. Controller to start booster pump.

Install sensor decoder on flow sensor and connect to the Tucor 2-wire path in accordance with manufacturer's specifications.

**POWER SUPPLY TO BOOSTER PUMP AND IRRIGATION CONTROLLER:**

Power to the controller to be supplied from a dedicated circuit.

Contractor shall be responsible for all wiring and associated equipment to connect power supply from dedicated circuit to the controller.

Install all wiring in accordance with local, state and national codes.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued****IRRIGATION CONTROLLER WITH RAIN SENSOR AND MAINTENANCE RADIO:**

Controller: shall be mounted in the mechanical vault in a location approved by the Engineer, in accordance with manufacturer's specifications and connected so as to form an operational system. Contractor shall coordinate factory start up.

Controller shall be installed on a dedicated circuit utilizing voltage stabilizer, UPS and modem jack in accordance with local codes.

Install a typewritten schedule on letter size white paper listing each valve number, type of sprinkler (rotor, spray), description of that zone and monthly irrigation runtimes based on historical evapo-transpiration and rainfall data. Example:

<u>Zone No.</u>	<u>Type</u>	<u>Description</u>	<u>April</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug</u>	<u>Sept</u>	<u>Oct</u>
2	Spray	Rear planter	5:00	6:00	8:00	12:00	13:00	9:00	6:00

Schedule to include the following note: Irrigation runtimes are based on historical data and should be used only as a guide. All irrigation runtimes should be adjusted accordingly based on actual climatic conditions.

Seal schedule in plastic laminate and place in a plastic 'zip-loc' type bag and locate inside of the controller door panel.

The Line Termination Box: shall be wall mounted in the mechanical room in a location approved by the Route 9A Landscape Architect and in accordance with manufacturer's specification.

Remote Field Access: Wall mount (permanent mount) transceiver inside mechanical room in a location approved by the Engineer and in accordance with manufacturer's specifications. Supply hand held radio to Route 9A Landscape Architect.

A site survey shall be conducted by a representative of the manufacturer to determine frequency and antenna requirements.

Sate will supply FCC license.

Rain Sensor: Install rain sensor in a location approved by the Route 9A Landscape Architect in accordance with manufacturer's instructions. Install all wire inside conduit. Conduit is not to be attached to the outer face of any building without the approval of the Engineer.

Mount the bypass adjacent to the controller.

**IRRIGATION 2-WIRE PATH AND CONDUIT:**

Conduit:

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued**

Install electrical conduit for control wiring.

Backfill and thoroughly compact around all conduit.

All conduit to have a minimum cover of .6 m.

**Controller Grounding:**

Install a 16.00 mm diameter copper clad steel ground rod, minimum 2.5 m long, 0.6 m from the controller. Wire and a one-piece bronze clamp shall connect the controller to the ground rod.

Ground rods must have 10 ohms or less resistance to the earth in which they are driven.

Bare AWG #6 copper wire shall be tied to the building ground system.

Install another ground rod at the end of the #6 wire.

Cover the ground rods with a Toro #850-00 cap, or approved equivalent.

Install satellite pedestal and wire conduits in accordance with manufacturer's instructions.

Install a circuit breaker on a 120 VAC line which feeds only to the satellite controller.

No satellite station shall be connected until the ground is tested and found to be 10 ohms or less.

**2-Wire Path:**

Install conduit for 2-wire path at least 0.6 m below finish grade.

Install Tucor control wires in conduit in mainline trenches. Place wires in trench adjacent to pipe.

Provide expansion joints in wire at 61 m intervals along main line.

Install conduit under pavements in PVC sleeves. Coordinate location of sleeve locations.

Provide 0.9 m long wire loop with expansion joint at remote control valves in control boxes to allow raising the valve bonnet to the surface without disconnecting the wires when repair is required. At all splice and valve assemblies make 5-6 turns of the wire around a piece of 0.5 NPS PVC pipe to allow for thermal expansion and contraction.

Connect two wire path to line line termination box.

Connect each remote control valve to one line decoder and connect to two-wire path.

Make all two-wire connections to automatic valves completely waterproof using DBY connector kits in

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued**

strict accordance with the manufacturer's recommendations.

**Irrigation 2-Wire Path Grounding Package:**

Install a 16.00 mm diameter copper clad steel ground rod, minimum 2.5 m long, 0.6 m from the controller. Wire and a one-piece bronze clamp shall connect the controller to the ground rod.

Ground rods must have 10 ohms or less resistance to the earth in which they are driven.

Bare AWG #6 copper wire shall be tied to the building ground system.

Install another ground rod at the end of the #6 wire.

Cover the ground rods with a Toro #850-00 cap, or approved equivalent.

**Surge Protection:**

All surge Protection, Grounding and Installation of equipment, therefore specified, to be installed in strict compliance with the manufacturer's recommendations and in accordance with local, Staten and Federal codes and requirements.

Install the Zap Trap in the electrical panel, or at the wall outlet according to the manufacturer's recommendations. Ground the unit to the electrical panel grounding bus.

Surge protection SP-100 to be installed at every line termination point. Install first SP-100 within 30.5 m of central control system. Additional installation of SP-100's are needed after every additional 180 m of wire cable, located at the nearest line decoder. The SP-100 ground wires to be connected to a single grounding rod.

Measure with Vibra-Ground or similar type instrument OHM reading at each grounding location. The Grounding Network to measure not more than 15 OHMS.

Record OHM readings at each grounding location on "Construction Record drawings".

**Connections:**

Connect piping to valves, sprinklers, and specialties.

Connect water supplies to lawn sprinkler piping with backflow preventers at connections to potable-water supplies.

Install backflow preventer with a minimum clearance of 0.3048 m between post and floor.

Ground electric-powered valves, and devices.

Tighten electrical connectors and terminals according to manufacturer's published torque- tightening values.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued**

If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

**SLEEVES:**

Install sleeves for all piping and conduit passing through planter walls, curbing, concrete or masonry walls and floors while the same are under construction.

Backfill and thoroughly compact around all sleeves.

Install ends of sleeves .61 m beyond the edge of all pavement and curbs.

All sleeves to have a minimum cover of .61 m.

**TRENCHING, BACKFILLING AND COMPACTING:**

Provide all excavation, backfilling and compaction required for the proper installation of all piping.

Excavation is to include all materials encountered; maintain open trenches dry at all times.

Excavate to the depths required to provide a 50 mm depth of sand bedding material for piping when unsuitable bearing materials are encountered.

Trenches shall be made wide enough to allow a minimum of 50 mm between parallel pipe lines. Trenches for pipe lines shall be made of sufficient depths to provide minimum cover from finish grade as follows:

.6 m minimum cover over main lines.

.6 m minimum cover over conduit for control wire from controller to valves.

.35 m minimum cover over lateral lines to sprinkler heads.

.30 m minimum cover over lateral lines to drip supply headers.

.30 m minimum cover over supply and exhaust headers.

Backfill material to be free from rock, large stones, or other unsuitable substances to prevent damage to pipe during backfilling operations.

Backfill trenches to match adjacent grade elevations with approved trench backfill material. Place and compact fill in layers not greater than 150 mm in depth to ninety-five percent (95%) maximum dry density at optimum moisture content under all paving areas and ninety percent (90%) maximum dry density under lawn and planting areas.

Dress off all areas to finish grades.

**ITEM 615.6000611 M – 2 NPS Wet Tap...Continued**

Restore all surfaces, existing underground installations, etc., damaged or cut as a result of the excavations to their original condition and in a manner approved by the State.

**MAIN LINE PIPE AND LATERAL LINE PIPE ASSEMBLY:**

Install pipe in accordance with ANSI/ASAE Standard #S376.1 and the recommendations of the manufacturer, including leveling of trench bottoms, bedding of pipe in the bottom of the trench and the installation valves of mechanical restraints on pipe joints, fittings and isolation valves.

Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent with a non-synthetic bristle brush.

Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable methods when pipe installation is not in progress. Leave in place until removal is necessary for completion of installation.

Pipe may be assembled and welded on the surface. Snake pipe from side to side of trench bottom to allow for expansion and contraction.

Make all connections between plastic pipe and metal threaded fittings using plastic male adapters. Allow solvent weld joints to set at least twenty four (24) hours before pressure is applied to the system.

**AUTOMATIC LAWN AND DRIP IRRIGATION VALVE ASSEMBLY INSTALLATION:**

Install valve boxes, as detailed on the drawings, with adequate space for operation, service and removal of the equipment in the box. Install a minimum of 150 mm of 13 mm sized, crushed stone over the filter fabric placed prior to the installation of the valve box for both drainage and leveling the box flush with finished grade.

Install on each automatic valve assembly a line decoder in accordance with manufacturer's specifications.

Install all valve boxes in shrub beds in locations approved by the Route 9A Landscape Architect. Contractor shall obtain the Route 9A Landscape Architect's approval prior to installation.

Where necessary to properly fit the valve assembly pipe, boxes are to be neatly cut so as to provide a firm fit to the pipe. Soil not to enter the valve box through these cut-outs.

Mount all boxes plumb and flush to grade. Extensions are to be used, as required for proper installation and setting. Establish the grade of the box with the surrounding grade using a leveling board not less than 1.25 m in length. Install the boxes to the underside of this board.

Install one (1) valve assembly per valve access box. Contractor shall obtain the approval of the Engineer for of the height of the valve access boxes.

Install the ball valves in "closed" positions. They are not to be opened until the main line piping system has been pressurized and flushing has been completed.

**ITEM 615.6000611 M – 2 NPS Wet Tap...Continued**

Assemble threaded PVC to PVC, or brass to PVC, with use of two (2) wraps of teflon tape.

Assemble threaded connections so that sealant or Teflon tape does not enter the pipe or fitting.

Contractor shall not use automatic valve manual bleeds for continual operation. For extended use without 24 VAC wiring, the manual bleed is to be left in the "open" position and the flow to the zone controlled (on-off) by the ball valve.

The contractor shall accurately record on the "Construction Record Drawings, as each decoder is being installed, the address number of the decoder at that location. Contractor shall also indicate which remote control valves are controlled by each specified decoder.

**LAWN SPRINKLER INSTALLATION:**

Connect the sprinklers and spray heads to the piping system by installing factory assembled swing joints. Swing joints size to be the same size as that of the IPS inlet of the sprinkler. The long nipple of the swing joint to be set between twenty and sixty degrees from the horizontal.

Quick-coupling valves to be connected to the pipe system by installing factory assembled swing joints. Install 1 NPS x 0.6 m long PVC pipe for horizontal support. Install two (2) #13 rebars, each .9 m long for vertical support. Install quick coupling valves in 150 mm valve boxes set within 25 mm of the bottom of the box cover. Refer to drawings for details.

Install all sprinklers perpendicular and flush with final grade.

**DRIP IRRIGATION INSTALLATION:**

Install Techline piping 2 NPS two inches below finish grade (not the top of mulch) in shrub beds.

Install Techline piping 0.30 m below finish grade in tree pits utilizing a grid design.

Staples will be spaced a maximum of 1.5 m and at every fitting to hold the dripperline in place.

**QUICK-COUPLING VALVE WITH CHAMBER:**

The Contractor shall furnish and install all cement lined pipe and fittings, valves, chambers and other sundries to complete the plumbing for the quick coupling. The Contractor shall connect the water lines as shown on the plan for a complete operating unit to the satisfaction of the Engineer.

The chamber shall be constructed of reinforced cast stone and set in place on the bench base as shown on the plans.

The No. 10 reinforcing bars shall protrude 75 mm beyond the bottom of the chamber. When the chamber is set in place, same shall be grouted to 25 mm holes which shall be provided in the bench base. Grout to base shall be 1:2 cement mortar.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued****FLUSHING LINES:**

After piping is installed and before sprinklers and spray heads are installed, open control valves and flush out the system with full head of water.

Test in accordance with paragraph on Hydrostatic Tests.

**TESTING AND ADJUSTMENT:**

Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.

Adjust lawn sprinklers so they will be flush with finish grade.

Adjust settings of controller.

Adjustment of the sprinkler equipment is to be done upon completion of the installation, to provide optimum performance and all to assure that all sprinklers are properly set to grade.

Adjust all automatic valves by means of the flow control stem and verify sprinkler discharge pressure on each lateral zone, with a pilot tube and gauge, to obtain optimum sprinkler performance.

Notify the Route 9A Landscape Architect seventy-two (72) hours prior to testing.

**CLEAN-UP:**

Remove and legally dispose of all excess materials resulting from the work operations of this section.

Accumulation of materials for disposal is not permitted. Disposal is to be made as fast as materials accumulate.

Job site must be left clean and repaired as per Contract specifications and Route 9A Landscape Architect's approval.

**DEMONSTRATION:**

After the system has been installed and prior to final review, test the entire system and demonstrate to the Route 9A Landscape Architect that the entire system meets coverage requirements and automatic controls function properly. Review maintenance information.

Provide seven (7) days advance written notice of demonstration.

**FINAL REVIEW AND ACCEPTANCE:**

Upon completion of demonstration of the system operation and when the "Construction Record Drawing" has been submitted a final review of the irrigation system will be made by the Route 9A Landscape

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued**

Architect, upon written notice requesting such a review. Submit the written notice at least seven (7) days prior to the anticipated review. Upon final review and acceptance, the State will notify the Contractor, in writing, as to final acceptance of the irrigation system. Date of the final acceptance by the State is the date beginning the warranty period.

Any irrigation equipment item required under this contract that is malfunctioning or in need of repair is to be removed and replaced. All replacements are to be of equipment and/or material originally specified. The cost of replacement is to be borne by the Contractor.

Upon acceptance of the entire system, instruct the Route 9A Landscape Architect in the complete operation of the entire system.

**METHOD OF MEASUREMENT****2 NPS WATER TAP:**

The quantity of 2 NPS Water Tap to be paid for shall be the number of 2 NPS Water Taps satisfactorily installed.

The quantity of Point of Connection Assembly to be paid for shall be the number of Point of Connection Assemblies satisfactorily installed.

**CURB GATE VALVE 2 NPS:**

The quantity of Curb Gate 2 NPS to be paid for shall be the number of Curb Gate Valves 2 NPS satisfactorily installed.

**CAST IRON VALVE BOX, 5.25 NPS:**

The quantity of Cast Iron Valve Box, 5.25 NPS to be paid for shall be the number of Cast Iron Valve Boxes, 5.25 NPS satisfactorily installed.

**WATER METER WITH REMOTE READING DEVICE – 1 NPS:**

The quantity of Water Meter with Remote Reading Device – 1 NPS to be paid for shall be the number of Water Meters with Remote Reading Device – 1 NPS satisfactorily installed.

**2 NPS BACKFLOW PREVENTER AND FITTINGS WITH ENCLOSURE**

The quantity of 2 NPS Backflow Preventer and Fittings to be paid for shall be the number of 2 NPS Backflow Preventer and Fittings satisfactorily installed.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued****IRRIGATION BOOSTER PUMP/FERTIGATION SYSTEM:**

The quantity of Irrigation Booster Pump/Fertigation System to be paid for shall be the number of Irrigation Booster Pump/Fertigation Systems satisfactorily installed.

**POWER SUPPLY TO BOOSTER PUMP AND IRRIGATION CONTROLLER:**

The quantity of Power Supply to Booster Pump and Irrigation Controller to be paid for shall be the number of Power Supply to Booster Pump and Irrigation Controllers satisfactorily installed.

**IRRIGATION CONTROLLER WITH RAIN SENSOR AND MAINTENANCE RADIO:**

The quantity of Irrigation Controller with Rain Sensor and Maintenance Radio to be paid for shall be the number of Irrigation Controllers with Rain Sensor and Maintenance Radio satisfactorily installed.

**IRRIGATION 2- WIRE PATH AND CONDUIT:**

The quantity of Irrigation 2- Wire Path and Conduit to be paid for shall be the number of linear meters of Irrigation 2-Wire Path and Conduits satisfactorily installed as measure in the field.

**IRRIGATION 2-WIRE PATH GROUNDING PACKAGE**

The quantity of grounding packages to be paid for shall be the number of grounding packages satisfactorily installed.

**SLEEVES:**

The quantity of sleeving to be paid for shall be the number of meters of sleeving satisfactorily installed.

**MAINLINE PIPE AND FITTINGS:**

The quantity of Mainline Pipe and Fittings to be paid for shall be the number of meters of Mainline Pipe and Fittings satisfactorily installed.

**LATERAL PIPE AND FITTINGS:**

The quantity of Lateral Pipe and Fittings to be paid for shall be the number of meters of Lateral Pipe and Fittings satisfactorily installed.

**ISOLATION VALVE ASSEMBLY**

The quantity of isolation valve assemblies to be paid for shall be the number of isolation valve assemblies satisfactorily installed.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued**

**AUTOMATIC VALVE ASSEMBLY – DRIP IRRIGATION:**

The quantity of Automatic Valve Assembly–Drip Irrigation to be paid for shall be the number of Automatic Valve Assembly–Drip Irrigation satisfactorily installed.

**AUTOMATIC VALVE ASSEMBLY – LAWN:**

The quantity of Automatic Valve Assembly–Lawn to be paid for shall be the number of Automatic Valve Assembly–Lawn satisfactorily installed.

**QUICK COUPLING VALVE WITH CHAMBER:**

The quantity of Quick Coupling Valve with Chamber to be paid for shall be the number of Quick Coupling Valves with Chambers satisfactorily installed as measure in the field.

**LAWN SPRINKLER WITH SWING JOINTS:**

The quantity of Lawn Sprinkler with Swing Joints to be paid for shall be the number of Lawn Sprinkler with Swing Joints satisfactorily installed.

**DRIP IRRIGATION TUBING:**

The quantity of Drip Irrigation Tubing to be paid for shall be the number of meters of Drip Irrigation Tubing satisfactorily installed.

**LINE FLUSHING VALVE:**

The quantity of Line Flushing Valves to be paid for shall be the number of Line Flushing Valves satisfactorily installed as measure in the field.

**TREE DRIP RINGS AND FITTINGS:**

The quantity of Tree Drip Rings and Fittings to be paid for shall be the number of Tree Drip Rings and Fittings satisfactorily installed.

**BASIS OF PAYMENT**

All unit prices shall include all costs necessary to complete the above items of work. Costs shall include but not limited to the cost of removing/replacing all existing shrubs to accommodate installation of the in-ground irrigation system and the cost of preparation of shop drawings and catalogue cuts necessary for the construction of the irrigation system.

Payment will be made when the irrigation materials are installed, successfully tested, backfilled, and approved by the Engineer.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued****2 NPS WET TAP:**

The unit price bid for each 2 NPS Wet Tap shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections, pipe, supports and gravel, backfill, and cleaning up of all excess debris as shown on the plans and as directed by the Engineer.

**CURB GATE VALVE 2 NPS:**

The unit price bid for each Curb Gate Valve 2 NPS shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections, pipe, supports and gravel, backfill, and cleaning up of all excess debris as shown on the plans and as directed by the Route 9A Landscape Architect.

**CAST IRON VALVE BOX, 5.25 NPS:**

The unit price bid for Cast Iron Valve Box, 5.25 NPS shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation of Cast Iron Valve Box, 5.25 NPS, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**2 NPS COPPER WATER SERVICE PIPE:**

The unit price bid for each 2 NPS Copper Water Service Pipe shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections, pipe, supports and gravel, backfill, and cleaning up of all excess debris as shown on the plans and as directed by the Engineer.

**WATER METER WITH REMOTE READING DEVICE – 1 NPS:**

The unit price bid for each Water Meter with Remote Reading Device – 1 NPS shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections, pipe, supports and gravel, backfill, and cleaning up of all excess debris as shown on the plans and as directed by the Engineer.

**2 NPS BACKFLOW PREVENTER WITH ENCLOSURE:**

The unit price bid for each 2 NPS Backflow Preventer and Fittings shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections, pipe, supports and gravel, backfill, and cleaning up of all excess debris as shown on the plans and as directed by the Engineer.

**IRRIGATION BOOSTER PUMP/FERTIGATION SYSTEM:**

The unit price bid for each Irrigation Booster Pump/Fertigation System shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections to PVC pipe, all valves, valve boxes, fertigation tanks, brick supports and gravel, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**POWER SUPPLY TO BOOSTER PUMP AND IRRIGATION CONTROLLER:**

The unit price bid for each Power Supply to Booster Pump and Irrigation Controller shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections to PVC pipe, all valves, valve boxes, brick supports and gravel, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**IRRIGATION CONTROLLER WITH RAIN SENSOR AND MAINTENANCE RADIO:**

The unit price bid for each Irrigation Controller with Rain Sensor and Maintenance Radio shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation of all equipment necessary to complete the system, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**IRRIGATION 2- WIRE PATH AND CONDUIT:**

The unit price bid per linear meter of Irrigation 2-Wire Path and Conduit shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, placing Irrigation 2-Wire Path Conduit, making all connections, backfill and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**IRRIGATION 2-WIRE PATH GROUNDING PACKAGE**

The unit price bid per linear meter of Irrigation 2-Wire Path Grounding Package shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, placing Irrigation 2-Wire Path Grounding Package, making all connections, backfill and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**SLEEVES:**

The unit price bid per linear meter of Sleeves shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, placing sleeves, making all connections, backfill and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**MAINLINE PIPE AND FITTINGS**

The unit price bid for Mainline Pipe and Fittings shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections to

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valves, valve boxes, brick supports and gravel, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**LATERAL PIPE AND FITTINGS**

The unit price bid for Lateral Pipe and Fittings shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections to valves, valve boxes, brick supports and gravel, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**ISOLATION VALVE ASSEMBLY**

The unit price bid for Isolation Valve Assemblies shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation of Valve Boxes, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**AUTOMATIC VALVE ASSEMBLY – DRIP IRRIGATION**

The unit price bid for Automatic Valve Assembly – Drip Irrigation shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, all necessary connections to the PVC pipe, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**AUTOMATIC VALVE ASSEMBLY – LAWN IRRIGATION:**

The unit price bid for Automatic Valve Assembly – Lawn Irrigation shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, all necessary connections to the PVC pipe, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**QUICK-COUPLING VALVE WITH CHAMBER:**

The unit price bid for quick coupling valves with chambers shall include the cost of all labor, materials, equipment and incidentals including excavation, backfill, cement, cast stone, reinforcement and all plumbing work and connections to water service within 1.5 meters from the face of the chamber all in accordance with the plans, the specifications and as directed by the Engineer.

**LAWN SPRINKLER WITH SWING JOINTS:**

The unit price bid for Lawn sprinklers with swing joints shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation of Lawn sprinkler with swing joints, backfill and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**ITEM 615.60000611 M – 2 NPS Wet Tap...Continued****DRIP IRRIGATION TUBING:**

The unit price bid for Drip Irrigation Tubing shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation, including all connections to piping, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**LINE FLUSHING VALVE:**

The unit price bid for Line Flushing Valve shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation of Line Flushing Valve, backfill and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**TREE DRIP RINGS AND FITTINGS**

The unit price bid for Tree Drip Rings and Fittings shall include the cost of all labor, materials and equipment necessary to complete the work including excavation, installation of all Tree Drip Rings and Fittings, all necessary connections to the PVC pipe, backfill, and cleaning up all excess debris as shown on the plans and as directed by the Engineer.

**ITEM 615.6006 11 M - DRINKING FOUNTAIN - TYPE 1**  
**ITEM 615.6007 11 M - DRINKING FOUNTAIN - TYPE 2**

### **DESCRIPTION**

This work shall consist of furnishing and installing Pedestal Mounted Drinking Fountains in accordance with the details indicated in the plans at the locations indicated in the plans or where directed by the Engineer.

### **MATERIALS**

- A. Drinking Fountain: Pedestal Mounted Drinking Fountain, shall be as manufactured by Haws Corporation, 1455 Kleppe Lane, Sparks, NV 89431. Phone (775) 359-4712, Fax (775) 359-7424. Type 1- Model 3500D and Type 2 – Model 6640.
1. Unit components shall be freeze resistant and shall include stainless steel receptor; all exposed fittings chrome plated; jug filler faucet; bubbler; push button operator, automatic stream regulator; galvanized supply and waste lines; valve box; and related components for underground connection to provide a complete system.
  2. Body: Polished or satin finished 304 stainless steel, 18 gauge or heavier; with No. 4. satin finish mounted to a 3/16”(5 mm) pedestal, with rounded corners, anti-splash back, and receptor contoured to eliminate splashing.
  3. Features: Self-closing supply valve, automatic stream regulator, two stream mound building projector and removable brass strainer plate.
    - a. All exposed brass trim polished and chrome plated.
    - b. Front mounted push-button shall pneumatically activate water valve remotely mounted below frost line.
    - c. Valve shall activate water flow through hooded bubbler having a non-squirt feature.
    - d. Internally mounted adjustable stream regulator shall control water flow.
    - e. Integral drain strainer.
  4. Color: Pedestal and Base shall be painted black.
  5. Materials and installations designated as handicapped accessible shall conform with the following:
    - a. ANSI A117.1 - Buildings and Facilities - Providing Accessibility and Usability for Physically Handicapped People.
    - b. The Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG), (Appendix A to 28 CFR Part 36).
    - c. The Uniform Federal Accessibility Standards (UFAS), (Appendix A to 41 CFR Part 101-19.6).

**ITEM 615.6006 11 M - DRINKING FOUNTAIN - TYPE 1**  
**ITEM 615.6007 11 M - DRINKING FOUNTAIN - TYPE 2**

6. Include, in addition to fountain manufacturer's components, items of valve box cover, insulation, gravel drain, and other items as required for complete installation.
- B. Valves and Valve Boxes: Valve and valve boxes are to be installed as shown and specified in section 663 "Water Supply Utilities" and subsection 722.6 "Water Service Pipe, Service, Valves and Fittings", except as additionally specified below:
1. In addition to the PVC assembly and removable cap included with the drinking fountain components, a Heavy Duty "Handhole" access box shall be provided to protect the components from frost.
  2. The access box cover shall be marked with a "W".
  3. Acceptable Access Box:
    - a. Manufacturer: Carson Industries LLC, 1160 Nicole Ct., Glendora, CA 91740.
    - b. Model: Heavy Duty, H Series 1212 Light Weight Polymer Concrete Cover and Body.
      - i. Cover Model No.: HLW1212-P0.
      - ii. Body Model No.: HLW1212.
- C. Fasteners: Vandal Resistant Fasteners: Torx head with center pin.
- D. Access Doors: Access Doors shall be 3mm (1/8") thick anodized aluminum natural clear finish to match brush chrome finish. Doors to be predrilled and counter-sunk to receive vandal resistant stainless steel screws. Screws to be stainless steel tamper resistant flat head spanner bolts, 6mm (1/4") diameter by 25mm (1") long minimum.
- E. Plumbing: All pipes except the bubbler tailpiece passing through walls shall be run through pipe sleeves. The stainless steel push button rod shall be protected with sleeves where it passes through walls. Bubbler controls shall be a stainless steel push button activated by a maximum of 2.27 kg (5 lb) of pressure. In the pedestal fountain, the factory installed portion of the cold water supply shall be from the bubbler down to, but not including, the 9mm (3/8") to 12mm (1/2") reducer. The factory-installed portion of the waste line shall be from the strainer down to, but not including, the reducing coupling. Quality Assurance: The Drinking Fountain shall have all unique components pre-tested and factory installed before delivery to site.
- 1 Strainer: Strainer shall be cast brass with exposed parts chromium plated, brushed finish. The tailpiece shall be soft temper copper tubing connecting to strainer with bronze elbow.
  - 2 Drain: All piping shall be of standard weight galvanized steel pipe. Fittings shall be galvanized M.I. banded pattern.
  - 3 Trap: Shall be 37mm (1-1/2") cast rough brass full S-swivel trap, tapped at inlet and outlet for 37mm (1-1/2") pipe and shall have a cleanout plug. Upon the written request of the licensed plumber to the Engineer, the trap may be eliminated.

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- 4 Water Piping: All water lines up to the 9mm (3/8") - 12mm (1/2") reducer shall be of rigid hard temper type "K" copper tubing, meeting the specification for A.S.T.M. Designation No. B88. Fittings shall be approved wrought copper and bronze solder joint pressure fittings (A.N.S.I. B 16.22). Above the reducer, piping to be 9mm (3/8") soft temper copper tubing with copper sweat fittings.
  - 5 Bubbler Control: Valve shall be brass with a stainless steel push button. All exposed parts to have a brushed finish. Bubbler controls shall be a stainless steel push button activated by a maximum of 2.27 kg (5 lb) of pressure. In the pedestal fountain, the factory-installed portion of the cold water supply shall be from the bubbler down to, but not including, the 9mm (3/8") to 12mm (1/2") reducer. The factory-installed portion of the waste line shall be from the strainer down to, but not including, the reducing coupling.
  - 6 Bubbler Assembly: Shall be one-piece stainless steel including the tailpiece. Provide a stainless steel washer and locknut for the tailpiece. All exposed parts to be stainless steel with a brushed finish.
  - 7 Pressure Regulators: Pressure regulating valve shall not be used.
  - 8 Ball Valve: The ball valve shall be similar and equal to SMC Model 025 brass ball valve.
  - 9 Pipe Supports: Pipe clamps shall be made up of 25mm (1") x 9mm (3/8") galvanized strap iron and shall be rigidly constructed to hold the pipe firmly in place. Clamps shall be held in place with anchor bolts drilled into the fountain shaft or base.
- F. Finishes: Precast Concrete shall have a fine sand texture simulating natural sandstone. All exposed edges shall be finished to a 6 mm (1/4") radius minimum. Exposed Brass shall be chromium plated and shall have a brushed finish. Exposed stainless steel shall have a brushed finish. Aluminum Doors shall have an anodized finish to match brushed chrome.
- G. Submittal
- The Contractor shall submit the following to the Engineer:
1. Brochure: The Contractor shall submit a Catalog Cut of the Drinking Fountain.
  2. Samples: Before starting work, the Contractor shall submit, for approval of the Engineer, the mix design of the precast concrete they propose to use as well as finished samples showing the extreme range of color and finish proposed for the finished work. Samples shall be marked with the name of the manufacturer, mix design, and finish.

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**ITEM 615.6007 11 M - DRINKING FOUNTAIN - TYPE 2**

3. Shop Drawings: The Contractor shall submit a complete dimensional Shop Drawing showing details of construction, reinforcement, plumbing, etc., including gauges of metal and thickness of wall construction.

#### H. Extra Materials

For each drinking fountain installed under this item, Contractor shall supply the applicable materials:

1. 1 (One) Tamper-proof tooled key as described under Access Door.
2. 1 (One) # 49000 S.S. Bubbler Assembly.
3. 1 (One) #11000 Plated Brass Strainer and Elbow Set.
4. 1 (One) 6mm (¼") Ball Valve.

### **CONSTRUCTION DETAILS**

- A. Install Drinking Fountain in compliance with all A.D.A. and A.N.S.I. standards, including all internal plumbing, access doors, foundation, concrete step and all external plumbing work and connection to water service and drainage lines. The fountain is to be handled by lifting points designated by the manufacturer; no chipped or cracked fountains will be acceptable.
- B. The Drinking Fountain drain shall be extended a minimum of 1.5m (5') beyond the foundation and be connected to the drain line. , Connecting to drain shall be made with ferrule and neat cement grout. The 25mm (1") cold water line shall be extended a minimum of 1.5m (5') beyond the foundation and connected to the water supply pipe with threaded fittings. All parts shall be installed in such a manner as to facilitate removal for purposes of replacement. Water and drain lines shall be pitched away from the drinking fountain. Pockets in rigid piping that cannot be drained by gravity will not be allowed.
  1. Field Installation: All field connections to be made by a Licensed Plumber.
  2. Connections: The Contractor shall connect the water and drain lines to pipes provided under this Item.
  3. Winterization: Drinking fountains shall be winterized by shutting off water supply and opening bleeder valve (outside of fountain). The fountain shall be designed to allow internal water to drain by gravity, without opening the access door.

### **METHOD OF MEASUREMENT**

The work will be measured for payment as the number of Pedestal Mounted Drinking Fountain satisfactorily furnished and installed.

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ITEM 615.6007 11 M - DRINKING FOUNTAIN - TYPE 2

**BASIS OF PAYMENT**

The unit price bid for Pedestal Mounted Drinking Fountain shall include the cost of all labor, materials and equipment necessary to satisfactorily perform the work except as shown otherwise.

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**ITEM 615.6008--11 M - HAND PUMP**

**DESCRIPTION**

This work shall consist of furnishing and installing a hand operated pump at the location indicated on the plans.

**MATERIALS**

Hand operated pump shall be #HPP-1 as manufactured by:  
Plumbing World  
994 East 20<sup>th</sup> Street  
Chico, CA 95928; Tel: 530-891-6191

**CONSTRUCTION DETAILS**

Hand operated pump shall be installed per manufacturer's instructions.

Submit shop drawings indicating materials, plans, details, method of field assembly, connections, installation instructions and a manual indicating maintenance schedule and instructions.

**METHOD OF MEASUREMENT**

Measurement will be by the number of hand operated pumps furnished and installed as shown in the Contract documents.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work.

**ITEM 11615.607020 M - WATER METER w/REMOTE READING DEVICE, 2 NPS****Description:**

Under this Item, the Contractor shall furnish and do all work necessary for the complete installation of new water meter and water meter strainer with Automatic Reading & Billing Devices (A.R.B., also known as Remote Reading Device) of the size shown and in accordance with the plans, specifications, and directions of the Engineer. Work shall include (but is not limited to) the installation of water meters, nipples, ARB System, piping, gate valve, conduit and wire, test tee and test tee valve, if required.

**Materials:****A. Water Meter**

1. Manufacturer:
  - a. Neptune, Schlumberger Industries  
230 Gardner Street - Suite 4  
Hingham, Massachusetts 02042  
Tel: (617) 749-5080
  - b. Kent Meters, Inc.  
903 N.E. Osceola Ave., P.O. Box 1852  
Ocala, Florida 34478-1852  
Tel: (352) 732-4670
  - c. Sensus Technologies, Inc.  
P.O. Box 487  
Uniontown, PA 15401  
Tel: (412) 439-7700
  - or
  - d. equal as approved in advance by NYSDOT, and New York City D.E.P.; Bureau of Water and Energy Conservation (f/k/a Bureau of Water Register)

2. Type:  
All meters furnished shall conform to the "Standard Specifications for Cold Water Meters" C700; latest revision issued by American Water Works Association (AWWA). The following requirements for specific details are made referring to the section numbers contained in the AWWA specifications.

All meters shall consist of a bronze maincase with the serial number stamped on the maincase.

Only displacement meters of the flat nutating disc type will be accepted for improved operation.

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The size, capacity and meter lengths shall be as specified in AWWA Standard C700, latest revision. The maximum number of disc nutations is not to exceed those specified in AWWA C700 latest revision to minimize premature wear.

3. **Meter Maincase:** All 2 NPS maincase shall be the removable bottom cap type with the bottom cap secured by six (6) bolts. Bottom caps shall be interchangeable, size for size, between frost-protected synthetic polymer or cast iron or non-frost protected (bronze) models. No meters utilizing frost plugs will be accepted.

Frost-protected meters shall have bronze or synthetic polymer bottom caps. The cross section of the bottom shall break clean when subjected to freezing pressure of 4136.9-5860.5 kPa.

All maincase bolts shall be of 300 series stainless steel to prevent corrosion. Bottom cap bolt lugs shall be enclosed in the maincase and shall not have externally exposed, threaded through holes.

All 2 NPS meters shall have a split design secured by bronze or stainless steel bolts.

4. **Register:** The Register shall be of the straight reading sealed magnetic drive type and shall contain six (6) numeral wheels. Registers must be sealed and dry. All direct reading register lenses shall be flat, of high strength, and impact resistant glass to prevent breakage.

The dial shall be of the center sweep pointer type and shall contain 100 equally divided graduations at its periphery. The register must contain a low flow indicator with a 1:1 disc nutating ratio to provide leak detection. Register boxes shall be bronze.

All meters must be adaptable to digital encoder register without interruption of the customer's service for the purpose of pit, remote or central meter reading.

The registers shall be secured to the maincase by means of a plastic tamperproof seal pin to allow for in-line service replacement. Seal screws are not accepted.

Register retainer rings shall have an impact resistant design which absorbs register glass lens impact.

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All registers shall have the size, model, and date of manufacturer stamped on the dial plate.

5. **Measuring Chamber:** The measuring chamber shall be of a 2-piece snap-joint type. The chamber shall be made of non-hydrolyzing synthetic polymer, shall be smoothly and accurately machined and shall contain a removable molded diaphragm of the same material as that of the chamber. No screws shall be used to secure the chamber together.

The control block shall be the same material as the measuring chamber and be mounted on the chamber top to provide sand ring protection. The control block assembly shall be removable to facilitate repairing. Control block assemblies shall be designed as not to allow any magnetic slippage which would result in a loss of revenue.

The measuring chamber outlet port shall be sealed to the maincase outlet port by means of an "O" Ring gasket to eliminate chamber leak paths.

The chamber is a nutating disc type. The flat nutating disc shall be three (3) piece construction molded of a non-hydrolyzing hard rubber and shall contain a type 316 stainless steel spindle. The nutating disc shall be equipped with a synthetic polymer thrust roller with a stainless steel shaft located within the disc slot. The roller head shall roll on the buttressed track provided by the diaphragm in the measuring chamber.

6. **Guarantee:** Registers must be guaranteed for at least ten (10) years. All meters will be guaranteed for one year on material and workmanship.

To ensure accuracy, each meter must be accompanied by a factory test tag certifying the accuracy at the flows required by AWWA C700 (low, intermediate, and full flow).

All meters shall be guaranteed adaptable to the Neptune ARB Encoder Electronic Meter Reading System or Equal.

**B. Strainer:**

1. **Manufacturer:**
- a. Neptune; Schlumberger Industries
  - b. Sensus Technologies, Inc.
  - c. Kent Meters, Inc., or
  - d. Equal as approved-in-advance.

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2. Mounting: All meters shall contain removable polypropylene plastic strainer screens. The strainer shall be located near the inlet maincase port, before the measuring chamber and control block assembly.

**C. Remote Reading Device:**

1. Manufacturer:
  - a. Neptune, Schlumberger Industries
  - b. Sensus Technologies, Inc.
  - c. Kent Meters, Inc., or
  - d. Equal as approved-in-advance.
  
2. Description-General:

The specifications cover a self-contained encoder register metering system designed to obtain remote simultaneous water meter registration directly from the register odometer.

The metering information shall be obtained through a remotely located receptacle using a compatible data capture system.
  
3. The above system shall be configured as follows:
  - a. Encoder Meter Register - Direct mounting, encoded odometer wheels, digital data stream. Batteries or pulses shall not be allowed.
  
  - b. Remotely Mounted Receptacle - Providing a communication link for the transmission of information from the register.
  
  - c. Data acquisition equipment with which the above components can be interrogated. Such equipment shall be a device that is preprogrammed with route information and is capable of storing collected data in solid-state memory. This device shall also electronically transfer the data for use by the utility billing computer.

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## 4. Encoder Register Unit:

## a. Registration:

1. The register shall provide a six (6) digit visual registration at the meter.
2. The unit shall, in a digital format, simultaneously encode the four (4) of six (6) most significant digits of the meter reading for transmission through the remotely located receptacle. (The most significant meter registration digits are defined as those digits on the register number wheels that denote the highest recorded values of water consumption.)
3. A quick indexing mechanism shall be employed which shall prevent ambiguous reading.
4. The register shall have a full test sweep hand or dial divided into gradients of down to 1/100th of the units of registration. Register test rings shall be available for shop testing.
5. The units of registration shall be in liters. These units shall be clearly designated on the face of the register.
6. The month and year of manufacture and other identification information shall appear on the face of the register.
7. The register shall employ a leak detection indicator on the dial face.
8. Register using pulse generation or conversion of pulses to digital output is not permitted. Batteries shall not be required.

## b. Mechanical Construction:

1. Materials used in the construction of the register shall be compatible with the normal water meter environment and with each other.
2. The unit shall possess a copper bottom and incorporate a rubber O-ring seal. Where indicated, pit set registers must be provided with moisture

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protection for all internal components when operating under flooded pit conditions.

3. The register and mounting base shall be integral components and should not allow for disassembly.
4. The register shall be attached to the meter case by a bayonet attachment. Fastening screws or nuts shall not be required. A tamperproof plastic seal pin shall be used to secure the register to the main case. No special tools shall be required to remove the register.
5. The register head must swivel 360 degrees without removing the seal pin to facilitate visual reading and ease of wiring.
6. The register shall be removable from the meter without disassembling the meter body and shall permit field installation and/or removal without taking the meter out of service.
7. Provision shall be made in the register for the use of seal wires to further secure the register.
8. Terminal screws must be accessible on the register for transmission wire connection to the remote receptacle or future connections to a telephone system.

c. Electrical Construction:

1. The materials employed for contacts and connectors shall inhibit corrosion and shall suffer minimal effect from environmental conditions to which they are exposed.
2. The number wheels used in the register assembly shall be provided with spring-type bifurcated metal contacts to insure a high probability of information transmission.
3. Connection shall be made to the register by three (3) screw-type terminals, sonically inserted into the register top. Access to the terminals

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shall be available to all models of register. A port cover shall be provided to cover the terminals after they have been wired.

4. Digitally formatted data transmitted from the register shall incorporate a check sum character to verify correct information transmission and integrity. Data errors shall be indicated by the reading equipment.

d. Meter Reading Information:

1. The encoder register shall provide to the reading equipment up to six (6) digits of meter reading. A ten (10) digit identification number shall also be provided with each reading.
2. The utility shall have the option to reprogram the internal register identification number an unlimited number of times.
3. The encoder register must have the capability to provide additional custom information to the reader. This information shall be programmed by the utility and have the ability to be reprogrammed at any time.
4. Information about the encoder meter reading output shall be provided with each proposal. Information on programming the register and equipment needed must be provided with the proposal.

5. Remote Receptacle

a. Mechanical Construction:

1. Where indicated, remote receptacles must be provided for attachment to a pit meter lid with another unit also designed for attachment by wall mounting.
2. The materials employed shall be corrosion resistant, resist ultraviolet degradation, unaffected by rain or condensation, and compatible with rugged service and long life.

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3. The pit mounted receptacle shall be mounted to the meter box using two screws to be provided by the utility. The hole size to be drilled in the meter box shall not exceed ten (10) millimeters each.
4. The pit mounted receptacle shall be provided with a minimum length of two (2) meters of wire connected and sealed at the receptacle without terminal exposure.

**b. Electrical Construction:**

1. The receptacle construction shall incorporate the function of a cable clamp or strain relief.
2. Design of the unit shall be such that it provides for mechanical and electrical connection between the receptacle and interrogation equipment.

- a. Cable: The connection cable shall be of the two-wire conductor type in a sheath which shall be abrasion and moisture resistant. Each conductor shall be color coded.

**D. Control Valve:**

The valve shall be a Class 125, all bronze gate valve, with non-rising stem and solid disc, with screwed bonnet and threaded ends, such as Stockham Figure B-110, or approved equal by Grinnell Corp., Jenkins Bros., or Milwaukee Valve..

**E. Piping:**

The piping shall be hard temper Type 'K' copper tubing meeting the N.Y.C. Department of General Services; Division of Municipal Supplies; Department of Purchase, Specification No. 32-T-1.64 and ASTM No. B88-1974. Fittings shall be approved wrought copper and bronze solder-joint pressure fittings. (AMSI B 16.22).

- Construction Details:
- A. The meters shall be set so that the dial faces upward and is horizontal. The dial shall not be more than one (1) meter above the floor. The encoder register shall be installed on meter as per manufacturer's instructions. The Touch Read Pit Lid Module shall be installed in the pit

**ITEM 11615.607020 M - WATER METER w/REMOTE READING DEVICE, 2 NPS**

cover as per the manufacturer's directions and recommendations, allowing reading of the meter from above ground level. The Contractor shall install a brick pier on concrete pad to support the new water meter at the proper height.

- B. Connections shall be made to meter by coupling, union or flange union on both inlet and outlet ends of the meter and bored for sealing, with holes not less than three (3) millimeters in diameter. Solder connections shall not be permitted. Contractor to allow sufficient cable slack for manhole cover removal.

**Submittals:**

- A. The Contractor shall submit the License Number of the Installer which must be a Master Plumber, licensed in the City of New York.
- B. The Contractor shall submit Catalog Cuts of the water meter, meter reading system, control valve, and all connected piping for approval in accordance with the Requirements of Section 100 of the N.Y. State D.O.T. Standard Specifications (Metric Edition).

**Method of Measurement:** WATER METER WITH REMOTE READING DEVICE, 2NPS will be measured by the number of units furnished and installed in accordance with the plans, specifications and directions of the Engineer.

**Basis of Payment:** The unit price bid for WATER METER WITH REMOTE READING DEVICE, 2NPS shall include the cost of all labor, materials, equipment, and all other incidental expenses necessary to complete the work, including wire, permits, nipples, gate valve, test tee and valve when required, all in accordance with the plans and specifications to the satisfaction of the Engineer.

Precast Water Meter Structure shall be paid for under a separate Item.

<b>ITEM 615.8003</b>	<b>11 M</b>	<b>- BENCH TYPE 1 - BACKED WITHOUT ARMS</b>
<b>ITEM 615.8004</b>	<b>11 M</b>	<b>- BENCH TYPE 2 - BACKLESS</b>
<b>ITEM 615 8005</b>	<b>11 M</b>	<b>- BENCH TYPE 3 - BACKLESS</b>

**DESCRIPTION**

This work shall consist of furnishing and installing benches at the locations indicated in the plans or as directed by the Engineer.

**MATERIALS**

1. Manufacturer: Landscape Forms, Inc., 431 Lawndale Avenue, Kalamazoo, MI 49048, Tel: (800) 430-6209, Fax: (269) 381-3455. [www.landscapeforms.com](http://www.landscapeforms.com)  
Bench Type 1: "Stay" with back, no center divider, embedded mount with silver powder coat Panguard II finish, 1450 mm long, with arm rests.  
Bench Type 2: "Stay" without back, no center divider, embedded mount with silver powder coat Panguard II finish, 1450 mm long, without arm rests.  
Bench Type 3: "Austin" without back, aluminum seat, no arms, surface mount cantilever support, 1525 mm long with silver powder coat Panguard II finish.
2. Sample for verification: for each bench unit type, not less than 150 mm long linear component.
3. Material certification: as applicable to item, signed by manufacturer.
4. Submit shop drawings indicating method of anchorage.

**CONSTRUCTION DETAILS**

1. Comply with manufacturer's written installation instructions. Complete field assembly of units, where required.
2. Unless otherwise indicated, install after landscaping and paving have been completed.
3. Install item level, plumb, true, and securely anchored and positioned at locations indicated on Contract Drawings and in accordance with approved shop drawings.

**METHOD OF MEASUREMENT**

The quantity to be paid for will be the number of benches of each type installed in accordance with the contract documents or as directed by the Engineer.

**BASIS OF PAYMENT**

The unit price for this item shall include the cost of furnishing all necessary labor, materials and equipment to satisfactorily complete the work.

**ITEM 15619.0301 M - FLASHING ARROW BOARDS (CALENDAR DAYS)**

**Description:** General. Under these item the Contractor shall furnish, install, maintain and remove Flashing Arrow Board warning devices in accordance with plans, this specification, NYS Manual of Uniform Traffic Control Devices or the directions of the Engineer. Flashing arrow boards are intended for use as temporary traffic warning devices during construction and obstruction periods.

The Contractor shall provide the number of Flashing Arrow Boards at the locations indicated in and for the period of time specified in the contract documents.

**Materials:** The Flashing Arrow Board shall be transportable self-contained units with a flashing symbol consisting of flashing amber lights arranged on a panel to form an arrow. The arrow panel shall consist of a 1200 mm by 2400 mm rectangular solid panel finished in non-reflective black, and shall be mounted so that the bottom of the panel is a minimum of 2100 mm above the roadway. The arrow indication shall cover the entire area of the panel and be composed of lamp units with 5 lamps in the arrowhead and 5 lamps in the shaft. Lamps shall be arranged and controlled to provide the following mode selections. Left Arrow, Right Arrow, Left and Right Arrow, and Caution. In the three directional modes, the lamps in the shaft next to the arrow point shall not illuminate. The caution mode shall consist of four or more lamps arranged in a pattern which will not indicate direction. The rear face of the arrow panel shall contain one or more clear lamps to indicate that the arrow board is operating properly. Arrow panel operation controls shall be mounted in a lockable enclosure.

The arrows shall be visible at a minimum distance of 1600 meters on a bright sunny day or a clear night. The lamps shall flash at a rate of not less than 25 nor more than 40 flashes per minute with a minimum lamp "on time" of at least 50 percent of the cycle.

The lamps shall be equipped with an automatic solar cell controlled dimming switch. Activation shall be at a level of approximately 5 candellas. The solar cell shall be located and equipped with a delay to prevent undesirable actuation from car lights. The dimming voltage to the lamps shall be manually controllable over a 5 to 12 volts effective range.

The arrow panel shall be trailer mounted, or with the permission of the Engineer, truck mounted. All Flashing Arrow Boards shall be powered by self contained engine driven generator systems capable of energizing the board for 72 hours, unattended. Flashing Arrow Boards also may be energized from utility company service, in addition to the self-contained generators.

**Construction Details:** The Flashing Arrow Board shall be installed at the locations shown on the plans or where directed by the Engineer, and properly aligned to provide optimum viewing by approaching motorists.

Flashing Arrow Boards may be relocated or reoriented on a daily basis or less as directed by the Engineer.

**ITEM 15619.0301 M - FLASHING ARROW BOARDS (CALENDAR DAYS)**

The Contractor shall be responsible for maintenance, repair and continuous operation of the Flashing Arrow Board until progress of work no longer requires its use, as directed by the Engineer.

Flashing Arrow Boards will not be required where they would interfere with the operation of a 3 color signal or flasher or where there is an operation controlled by a signal or flagger. Flashing Arrow Boards will not be required for detours where the number of through traffic lanes is not reduced unless specifically indicated on the plans.

Flashing Arrow Boards shall be placed in accordance with the Manual of Uniform Traffic Control Devices. They shall be used as a substitute for the W1-II B; W1-II C; W1-12B; or W1-12C large arrow sign located nearest the beginning of the taper. The arrow boards shall be mounted so that the base of the panel is at least 2100 mm above the pavement surface and properly aligned to provide optimum viewing by approaching motorists. Flashing Arrow Boards may be relocated or reoriented on a daily basis or more frequently as ordered by the Engineer.

The Contractor shall be responsible for maintenance, repair and continuous operation of the Flashing Arrow Board until progress of work no longer requires its use, as directed by the Engineer.

**Method of Measurement:** This work will be measured by the number of calendar days each Flashing Arrow Board is used. A calendar day is defined as one Flashing Arrow Board in use for 24 consecutive hours or portion thereof exceeding one hour.

**Basis of Payment:** General, the price bid per calendar day for this work shall include the cost of all material, equipment, labor, maintenance, and electrical power necessary to complete this work in a manner approved by the Engineer.

Failure of the Contractor to comply with the work specified under the construction details of these specifications shall be considered as unsatisfactory maintenance and protection of traffic with payment deductions made in accordance with "Subsection 619-5 BASIS OF PAYMENT, General", of the Standard Specifications.

The unit price bid for Flashing Arrow Boards shall cover the cost of all the work specified in "General" above as well as the cost of movement or relocation of the Flashing Arrow Board as required by the progress of the work or as directed by the Engineer.

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**ITEM 11619.0598 M - LIGHTING FOR TEMPORARY CONCRETE BARRIERS**

**DESCRIPTION** The Contractor shall furnish, install, move, and maintain lighting for temporary concrete barriers shown on the plans.

**MATERIALS** Lighting for temporary concrete barriers shall meet the requirements of this specification and shall be in accordance with the plans and the New York State Manual of Uniform Traffic Control Devices.

No materials or methods which will cause damage to the existing pavement or to the temporary concrete barrier shall be employed in the installation of the lighting system.

Steady burning barrier lights (whether powered by an electric power source or by a battery pack) shall emit a yellow light, and shall have a minimum beam candle power of two candelas, maintained within a solid angle of 9° on each side of the vertical axis, and 5° above and 5° below the horizontal axis.

**CONSTRUCTION DETAILS** The Contractor shall furnish, install, move, and maintain lighting for temporary concrete barriers where and as indicated on the plans. The lights shall be spaced as shown on the plans.

Two circuits, both with steady-burning lights, shall be used. Adjacent lamps shall be on different circuits. Steady burning lights shall be powered by an electric power source or by a battery pack.

The hours for operation of steady-burning lights shall be dusk to dawn. The Contractor shall also be responsible for turning on and operating the lights in the daytime (dawn to dusk) during periods of inclement weather such as snowfall, fog, etc. or when directed by the Engineer.

**METHOD OF MEASUREMENT** Lighting for temporary concrete barriers (powered by electric power or battery source) will be computed for payment by the number of meters of temporary concrete barrier equipped with working lights.

Measurement shall be made along the centerline of the uppermost surface of the temporary concrete barrier. The lighting will be measured only once, not each time it is moved to a new location.

**BASIS OF PAYMENT** The unit price bid shall include the cost of furnishing all materials, power, labor, and equipment necessary to light temporary concrete barriers.

After installation and demonstration of satisfactory operation, payment will be made for ninety (90) percent of the quantity of barrier lighting furnished and installed in accordance with contract requirements. The remaining ten (10) percent will be paid upon removal.

**ITEM 11619.0601 M - TEMPORARY DECKING****DESCRIPTION**

Under this item the Contractor shall design, furnish, install, maintain and remove temporary roadway and sidewalk decking where shown on the plans or where ordered in writing by the Engineer.

All decking and supporting systems shall be so designed that during installation and removal at least one-half the width of the roadway and sidewalks can be kept open for traffic at all times and as to comply with Construction Details. Before the decking and street supporting systems are placed, the plans and design computations for them shall be submitted to and shall be satisfactory to the Engineer. In excavations covered by decking a means of illumination, satisfactory to the Engineer, must be provided and maintained at all times, whether work is or is not in progress, so that the supports of the decking may at all times be readily inspected.

Surfaces of all decking, including steel plates used in connection with the decking, shall be flush and line up with the existing adjacent street surfaces. All plating and decking for vehicular traffic and pedestrian surfaces shall have skid-resistance equal to or greater than the skid-resistance of the adjacent existing street, roadway or sidewalk surfaces. The Contractor shall maintain the skid-resistance quality of plating and decking as required.

All decking and supports shall be designed in accordance with the provisions of this specification.

**MATERIALS**

All timber and lumber used for decking and the supports for same shall be new, sound and free from any defects that may impair its strength. All decking used for temporary surfaces shall be sound, straight and free from all shakes and large loose knots.

All timber and lumber used for decking shall be new Douglas Fir Larch, select structural grade or better or new Southern Pine 1 Dense SR. Decking members shall be immediately replaced if the Engineer determines that the members are excessively worn. Timber and lumber used for decking shall be designed in conformity with the requirements of the National Design Specifications for Wood Construction, National Forest Products Association, 1977 and its Supplement Design Values for Wood Construction dated June 1978.

The Contractor, at his expense, shall have as independent inspection agency and/or testing laboratory, approved by the Engineer, inspect the timber and lumber to be used for decking. Each piece

**ITEM 11619.0601 M - TEMPORARY DECKING**

of timber and lumber shall be stamped to indicate that it meets the grade and type indicated on the approved working drawing.

Decking shall be designed in accordance with this specification. Concrete decking with an approved skid resistant surface may be substituted for timber decking for portions of the work subject to the approval of the Engineer. To obtain such approval the Contractor shall submit working drawings and design calculations based upon the loads herein indicated.

1. All new steel for temporary decking support structure shall be ASTM A36. Other grades of steel may be substituted only with the approval of the Engineer.
2. If new steel is used for temporary decking support structure, the allowable unit stresses indicated in Reference Standard 1 may be increased by 20% except for columns and struts or as otherwise noted in these standards or as directed by the Engineer. New steel is defined as steel being used for the first time.
3. Used steel for temporary structures and underpinning will be permitted subject to the Engineers approval of the material. The unit stresses for used steel shall not exceed the allowable unit stresses indicated in Reference Standard 1 or in the case of A-7 steel Reference Standard 2.
4. No increase in allowable unit stresses will be permitted.
5. For primary and secondary bracing members, soldier beams, struts, etc. subjected to axial loads only, or to combined axial loads and flexure, no increase in allowable unit stresses will be permitted for the axial compression portion of the load.
6. Secondary bracing shall be designed using a minimum axial load of 2% of the load in the primary bracing member. Secondary bracing is defined as bracing that is required to reduce the unbraced length in either the major or minor axis, of the primary bracing members. The unit stresses shall not exceed the allowable unit stresses given in the appropriate reference standards.
7. Unit stresses for stress field welded connections shall not exceed 75% of the allowable unit stresses indicated in Reference Standard 1.

**ITEM 11619.0601 M - TEMPORARY DECKING**

8. Unit stresses and general design guide lines not given in the Reference Standards should be submitted to the Engineer and DCES for approval before their use in the preparation of working drawings.
9. The allowable unit stresses, load and general engineering requirements for the temporary support and structures that are not within the jurisdiction of the NYSDOT such as railroads, highway structures, bridge piers, etc. must conform to the requirements established by the controlling agency or authority.

**CONSTRUCTION DETAILS**

An original and five copies of shop drawings and design calculations for the decking and its supports signed and stamped by a Professional Engineer licensed in the State of New York shall be submitted to the Engineer for his review and shall be revised and resubmitted in accordance with his comments until approved.

The Contractor shall design the decking in accordance with the following:

**A. Allowable Unit Stresses for Temporary Decking****1. Structural Steel for Temporary Structures and Underpinning of Buildings**

Manual of Steel Construction (AISC) (most recent edition), Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

**2. A-7 Structural Steel for Temporary Structures**

Manual of Steel Construction (AISC) 6th edition (1963), Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

**3. Reinforced Concrete**

Working Stress Design in ACI Standard Building Code requirements for Reinforced Concrete (ACI 318 latest edition), Design of Concrete and Reinforced Concrete Structures.

**ITEM 11619.0601 M - TEMPORARY DECKING**4. Lumber

National Design Specifications for Stress-Graded Lumber and its Fastenings, National Forest Products Association (latest edition), Allowable Unit Stresses - "Engineered Uses"

B. Loads and Criteria for Design of Steel Decking Support Beams

1. The dead load shall include the weight of pipes and other subsurface structures carried by the decking in addition to the dead load of the decking system itself.
2. The live load shall be computed in either of the following ways:
  - a) 1225 kilograms per square meter (250 pounds per square foot) on any two adjacent 3 meter) 10 foot roadway lanes and 975 kilograms per square meter (200 pounds per square foot) on the remaining area of roadway and sidewalk.
  - b) On any two adjacent 3 meter (10 foot) roadway lanes, a single group of four resultant wheel loads of 14,000 kilograms (31,000 pounds) each with a consecutive spacing of 1.85, 1.2, 1.85 meters (6,4,6 feet) placed on line directly over the decking support beams and at right angles to the direction of traffic, and at the center of each 3 meter by 3 meter (10 foot by 10 foot) area of roadway and sidewalk outside of these lanes, two resultant wheel loads of 4500 kilograms (10,000 lbs.) each spaced 1.85 meters (6 feet) apart.

If less than two 3 meter (10 foot) traffic lanes are available, place a single group of two wheel loads of 14,000 kilograms (31,000 pounds) with a spacing of 1.85 meters (6 feet) in the available traffic lane.

The 14,000 kilogram (31,000 pound) load is the resultant of the two rear wheel groups of a 11.5 cubic meter (15 yd.) Concrete Truck, having a spacing of 1.35 meters (4.5 feet) between their rear axles and is based on a decking support beam spacing of 3 meters (10 feet) center to center. Using the 11.5 cubic meter (15 yd.) Concrete Truck wheel loading shown in Figure #1 the 14,000 kilogram (31,000 pound) wheel resultant can be modified for a closer decking support beam spacing.

3. The previous loads, both uniform and concentrated shall be placed so as to produce the maximum bending moment for each case. The design of the decking support beam is to be based on the more critical moment.

WHEEL LOADING 11.5m<sup>3</sup> CONCRETE TRUCK (15C.Y.)  
GROSS WT. 45 METRIC TONS (50 TONS)

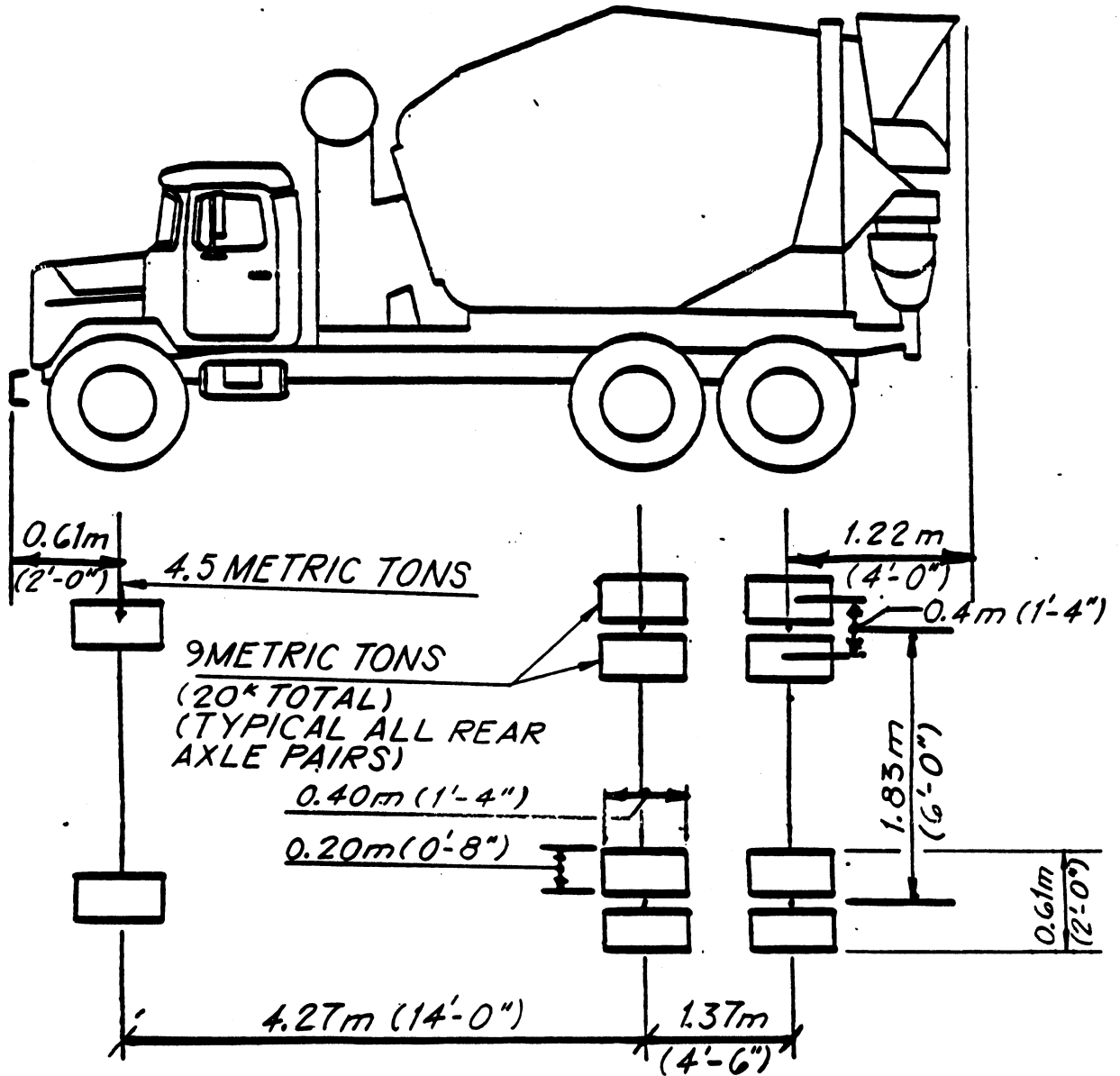


FIGURE 1

WHEEL LOAD = 4.5 METRIC TON (10K) WHEEL  
 RESULTANT OF TWO REAR WHEELS = 9 METRIC TONS (20K)  
 FRONT AXLE LOAD = 9 METRIC TONS (20K)  
 REAR AXLE LOAD = 18 METRIC TONS (40K) EACH

**ITEM 11619.0601 M - TEMPORARY DECKING**

4. The decking support beam must be checked for web shear capacity using the maximum reaction on the decking support beam.

To determine the axial components in the design of the soldier beam and bending moment in the strong axis of the cap beam, the loads should be positioned to produce the maximum reaction on the decking beam support system.

5. The allowable maximum total load deflection of a decking support beam shall be 1/240 of its clear span, however it is subject to review when the working drawings are submitted by the Contractor and will be considered with reference to utilities supported via decking and other factors that impact deflection. The maximum total load deflection shall be calculated using the reduced moments and shears as indicated in paragraph 8 below.
6. Decking Support Beams shall have a maximum spacing of three meters (ten feet) center to center. The use of a greater spacing will be permitted only with the approval of the Engineer.
7. Where the loading due to the Contractor's machinery or equipment is in excess of paragraph 2, above, the street and sidewalk supporting system shall be of sufficient strength to safely support such loads.
8. Reduction of Load Intensity in Design of Decking Support Beams.

Where maximum moments and shears are produced in any member by loading any number of traffic lanes simultaneously, the following percentages of the live load moments and shears shall be used in view of the improbable coincidence of loading.

One Lane	100%
Two or Three Lanes	90%
Four or More Lanes	85%

C. **Timber Decking Requirements shall be as follows:**

1. Allowable unit stresses for timber decking shall be as specified in Reference Standard 4.
2. Wherever possible, roadway decking timbers should span between at least three decking support beams.

**ITEM 11619.0601 M - TEMPORARY DECKING**

3. Roadway decking timbers spanning between two decking support beams will be permitted on a limited basis to provide access hatches for excavation equipment or as otherwise required for the contractor's operations.
4. Wherever possible, roadway decking timbers shall be placed with the twenty (20) foot dimension parallel to the direction of the traffic.
5. Roadway and sidewalk decking shall conform to the general elevation of the permanent roadway and sidewalk they are temporarily replacing.
6. Decking timbers shall be designed for maximum moment and shear resulting from two 4,500 kilogram (10,000 pound) wheel loads spaced 1.35 meters (4'-6") apart. This loading is based on decking timbers running parallel to the direction of traffic. At intersections and other special loads, the decking timber design load should be evaluated and based on the wheel loading of an 11.5 cubic meter (15 cy) concrete truck as specified in paragraph B.2 above. Also see paragraph B.7 above for heavy equipment.

**D. Concrete decking panels shall be as follows:**

1. Precast reinforced concrete panels may be substituted for timber decking for portions of the work with the approval of Engineer.
2. Allowable unit stresses for concrete decking panel shall be as specified in Reference Standard 3.
3. Concrete panels shall be designed for maximum moment and shear resulting from two 9,000 kilogram (20,000 pound) loads spaced 1.35 meters (4'-6") apart positioned for maximum moment and maximum shear.
4. Concrete panels to be properly anchored to decking support beams.
5. Minimum thickness of concrete panels shall be 230 mm (9"). The preferred thickness is 305 mm (12").
6. Panels designed of prestressed concrete may be submitted to the Engineer for approval.

**ITEM 11619.0601 M - TEMPORARY DECKING**

7. The concrete panel design loading and minimum thickness are based on the assumption of a 1.5 m x 3 m (5' x 10') concrete panel used in conjunction with a 3 meter (10') spacing of decking support beams. The 3 meter (10') length of the concrete panel is assumed to be parallel to the direction of traffic. Concrete panels used at intersections and other special location should be designed based on their location and the wheel loading of a 11.5 cubic meter (15 cy) concrete truck as given on Section B.2 above.
8. The wearing surface of each panel to be broom finished.
9. Reuse of panels to be approved by Engineer due to potential for wear and weathering.

A Typical Concrete Decking Panel is shown on the following page.

**E. Ramps**

Where existing street surface elevation must be raised to clear utilities, ramps subject to approval of the Engineer may be used. The live load for the decking support beams under the ramp itself and the first 6 meters (20') of horizontal decking following the ramp shall be increased by 30% to account for impact.

**F. Slopes**

When designing decking support beams, where the existing street surface is on a slope the lateral component of the decking must be provided for. The design shall use adequate bracing to stabilize the support system.

**G. Steel Plates Over Narrow Excavations**

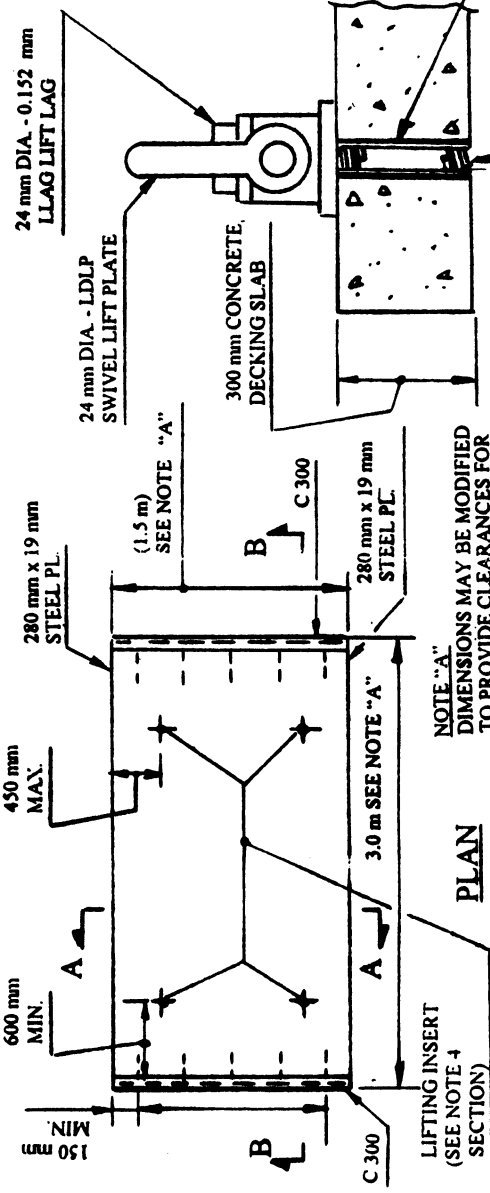
Steel plates are generally a standard size of 1.5 m x 3 m (5'x10'). The plate thickness and corresponding maximum clear spans are given below as a guide. The Contractor may submit other plate thicknesses and/or clear spans for approval by the Engineer. The plates are assumed to be placed with the 3 m (10') dimension perpendicular to the trench excavation. The plates should be spiked and ramped with asphalt concrete or otherwise secured to prevent movement due to the vibrations caused in the plate from the flow of traffic. Steel plates used for pedestrian traffic shall be provided with a non-slip surface.

	<u>PLATE SIZE</u>	<u>MAXIMUM CLEAR SPAN (LS)</u>
ONE WAY	25 mm (1")	.9 m (3'-0")
SUPPORTED	32 mm (1¼")	1.22 m (4'-0")

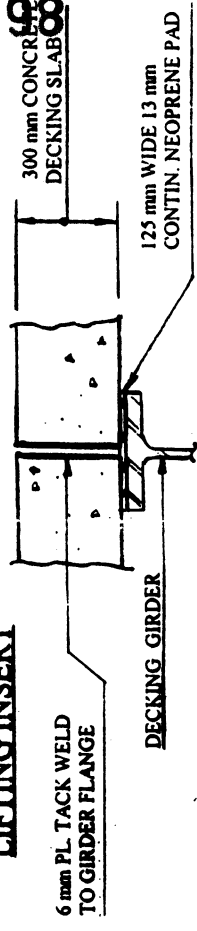
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**NOTES:**

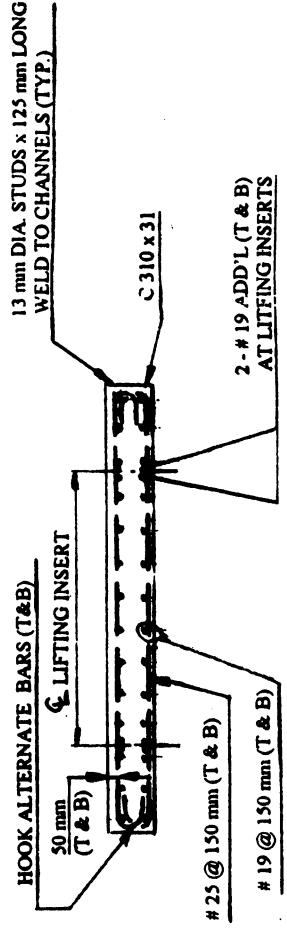
1. CONCRETE AND REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF THIS SPECIFICATION
2. AIR-ENTRAIMENT SHALL BE PROVIDED IN THE CONCRETE AS PER THE REQUIREMENTS OF THIS SPECIFICATION.
3. THE TOP AND BOTTOM SURFACE OF THE CONCRETE DECKING PANEL SHALL BE GIVEN A BROOMED FINISH OR EQUIVALENT
4. SEE DETAIL ON THIS DRAWING FOR LIFTING INSERTS. ALL LIFTING DEVICES ARE AS SHOWN IN MANUAL OF ENGINEERED TYING DEVICES OF THE RICHMOND SCREW ANCHOR CO. BULLETINS NOS. 8 & 9 OR EQUAL. USE ALL FOUR LIFTING INSERTS AT THE SAME TIME FOR LIFTING THE PANEL.
5. THE CONCRETE SLAB PANEL DETAILS SHOWN ON THIS DRAWING SUPPLEMENT THE INFORMATION SHOWN THIS SPECIFICATION.
6. TO LESSEN VIBRATION AND NOISE, CONCRETE BETWEEN CHANNEL SECTIONS AND DECKING SUPPORT BEAMS WILL BE CUSHIONED WITH A MATERIAL TO BE APPROVED BY THE ENGINEER. SEE DETAIL ON THIS DRAWING.



**SECTION THRU LIFTING INSERT**



**A METHOD OF CONCRETE SLAB PANELS ON DECKING DETAILS**



CONTRACTOR MAY SUBMIT ALTERNATE DESIGNS AND DETAILS FOR ENGINEER'S APPROVAL.

**TYPICAL CONCRETE DECK SLAB PANEL (N.T.S.)**

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**ITEM 11619.0601 M - TEMPORARY DECKING**

	<u>PLATE SIZE</u>	<u>MAXIMUM CLEAR SPAN (LS)</u>
	38 mm (1½")	1.5 m (5'-0")
	45 mm (1¾") or two 32mm (1¼")	1.93 m (6'-0")
	51 mm (2") or One 38 mm (1½") plus One 32 mm (1¼")	2.45 m (8'-0")
TWO WAY	19 mm (¾")	1.22 x .9 m (4'-0" x 3'-0")
SUPPORTED	25 mm (1")	1.93 x .9 m (6'-0" x 3'-0")
	32 mm (1-1/4")	2.45 x .9 m (8'-0" x 3'-0")

The decking support system and decking shall be of sufficient strength to safely support in addition to its own weight all equipment and structures, whether for construction or otherwise, to be placed thereon, and that of pipes and other subsurface structures supported therefrom, and in addition in accordance with this specification.

The Contractor is required to restrict the loading on the temporary roadway decking to the permissible loadings and the Contractor shall erect and maintain in the streets, warning signs visible at all times and take such other measures as may be necessary to caution the public against placing excessive loads upon the decking.

Steel plates used in connection with the decking shall be of sufficient strength in accordance with this specification. Steel plates shall be made skid-resistant in an approved manner.

The excavation of the roadway pavements and sidewalks shall be made in sections to the depth necessary to install decking beams, followed immediately by the decking. These sections shall be handled in such an order that there will always be available, on one side or the other of a line 15 feet away from each building line, a roadway on which the ladder trucks of the Fire Department can operate, or equivalent facilities satisfactory to the Engineer. Wherever any portion of roadway or sidewalk is opened up, the work to be done must be prosecuted continuously; otherwise the opening shall be decked over.

When the decking has been installed, it shall be maintained in proper condition for the use of traffic and for access to adjacent properties until it is removed and the temporary pavement is laid as hereinafter provided. Openings may be made in the decking as approved by the Engineer from time to time when and as necessary for the prosecution of the work in the opinion of the Engineer provided, however, there shall always be maintained on one side or the other of a line 4.5 meters (15 feet) away from each building line a roadway on which the ladder trucks of the Fire Department can operate, or equivalent facilities satisfactory to the Engineer.

**ITEM 11619.0601 M - TEMPORARY DECKING**

All openings in the decking shall be protected at all times by electrically lighted temporary barrier and the decking shall be replaced over each opening at the end of each workday, or, as soon as the work is completed, or discontinued or when in the opinion of the Engineer it is necessary in the interest of safety or public necessity.

Use of steel plates in connection with the decking will be limited to a maximum of 4 weeks over the main excavation and as may otherwise be permitted by the Engineer over narrow trenches.

Wherever the excavations are decked, or where gases are liable to accumulate, suitable openings covered with steel gratings shall be provided for proper ventilation.

**METHOD OF MEASUREMENT**

The quantity of Temporary Decking shall be measured as the number of square meters of decking within the payment lines for excavation measured along the top surface of the decking. No deduction from the area to be paid for under this item will be made for the area occupied by manhole heads, hydrants, lighting poles and other such structures forming a part of, or extending through, the deck.

**BASIS OF PAYMENT**

The unit price per square meter of decking shall include the cost including all materials, labor and materials to design, furnish, install, maintain and remove the decking and its support system in accordance with this specification. The cost of preparation and submittal of shop drawings and calculations for the decking and its support system for review by the Engineer is included in the price bid for this item. The cost of furnishing, installing, maintaining and removing the warning signs required for the decking is included in the price bid for this item..

For the purpose of partial estimates, 75 percent of the price bid for this item will be paid for decking of any area after the wearing surface is installed complete, ready for traffic in such area; the remaining 25 percent of the price bid will be paid for decking any area after the wearing surface and the supports for same have been completely and permanent removed and the backfilling completed in such area.

**ITEM 619.21XX 14 - PORTABLE, VARIABLE-MESSAGE SIGNS (LED TYPE)**  
**ITEM 619.22XX 14 - PORTABLE, VARIABLE-MESSAGE SIGNS (HYBRID FLIP-DISK TYPE)**

**DESCRIPTION**

This work shall consist of providing, programming, operating, maintaining, relocating and removing portable, variable-message signs (PVMSs) at locations indicated in the contract documents or as directed by the Engineer. The locations of PVMSs and duration of setup will be specified in the contract documents under special note "Requirements for Portable, Variable-Message Signs (PVMSs)." PVMSs are intended to supplement other traffic control devices by displaying symbolic or word messages, but are not to be used alone to replace conventional traffic control devices.

**MATERIALS**

PVMSs shall meet the requirements of Sections 201.3 and 294.6 of 17 NYCRR Chapter V a.k.a. the New York State Manual of Uniform Traffic Control Devices. The PVMS shall be trailer-mounted and equipped for use on public highways in accordance with NYS Vehicle and Traffic Law. The trailer shall have four (4) leveling jacks capable of leveling the trailer on grades up to 1 on 6 and stabilizing the trailer in winds up to 130 km/h.

The PVMS shall operate primarily from a solar-powered electrical system and shall be capable of displaying for at least 21 days without auxiliary charge. The electrical system shall consist of batteries and solar array panels and on-board auxiliary charging system to enable the batteries to be recharged via a 110V AC connection.

The PVMS shall have a three-line display with a minimum of eight, 450-mm high characters per line and shall be capable of displaying three (3) separate messages in a cyclical sequence. Messages shall be clearly legible from a distance of 275 m and illumination intensity shall automatically adjust for all daytime and nighttime ambient conditions.

The PVMS shall be equipped with a sign control console mounted in a lockable, weather-resistant compartment. The sign controller shall have a programmable memory capable of storing messages pertinent to planned construction activities, including emergency messages. The controller shall be equipped with 14-day-calendar programming capability, providing the ability to start and stop the display of a minimum of three (3) different messages on a repeating schedule without an operator present. The controller shall have programmable messages, display rate, and display interval settings. The controller shall blank the sign if the output voltage drops below the manufacturer's recommended output level.

The PVMS shall be equipped with a modem and control software using a Microsoft Windows operating system, Windows 98 or later. The Contractor shall supply the Engineer with two (2) copies of operating instructions for the PVMS and the control software. Electronic copies of software instructions are acceptable.

***Light-Emitting Diode (LED) Type***

The LED-type PVMS unit shall have light-emitting diodes arrayed in a matrix for each character to be 7 pixels high by 5 pixels wide with 4 LEDs per pixel. The LED display shall have the ability to display characters at a minimum height of 450 mm in double-stroke font. The controller shall provide a means of dimming the pixels.

***Hybrid, Flip-Disk Type***

The hybrid, flip-disk type PVMS, shall have pixels consisting of individual electromagnetic disks with a minimum of two (2) high-output amber LEDs. The disk face shall be covered with yellow,

**ITEM 619.21XX 14 - PORTABLE, VARIABLE-MESSAGE SIGNS (LED TYPE)**  
**ITEM 619.22XX 14 - PORTABLE, VARIABLE-MESSAGE SIGNS (HYBRID FLIP-DISK TYPE)**

prismatic, retroreflective sheeting, or an approved equal. The PVMS shall operate using both flip-disk and light-emitting diode (LED) during nighttime and low-light periods. The hybrid, flip-disk type pixels shall be arranged in a matrix, 7 disks high by 5 disks wide for each character.

***Cellular Communications Option***

The PVMSs with cellular communications shall be equipped with a cellular telephone and a modem capable of remotely operating the control software. The phone numbers for PVMSs on a contract shall be sequential, whenever possible, to facilitate remote control of multiple units. The unit shall accept a landline telephone connection without rewiring or modification.

***Radar Option***

The PVMS with radar shall be equipped with a radar speed-detection option. This feature provides the system with the ability to determine the speed of an approaching vehicle and interrupt the programmed sequence with a special default message displaying the vehicle's speed.

**CONSTRUCTION DETAILS**

The Contractor shall provide, operate, and maintain PVMSs at the locations shown and for the time periods indicated in the contract documents until the progress of work no longer requires their use. PVMS shall remain the property of the Contractor. When in use, the units shall be placed so that the base of the message panel is at least 2.1 m above the adjacent pavement surface and aligned to provide optimum viewing by approaching motorists. The Contractor shall relocate or reorient PVMSs on a daily basis or more frequently, if necessary, as maintenance and protection of traffic requirements dictate at no additional cost to the State. The Contractor shall supply the Engineer with an accurate log of all messages and times messages were displayed monthly, not later than the 15<sup>th</sup> of the following month. The log of messages may be either a listing in a manual register or printouts from the control software. The Contractor shall inform the Engineer of PVMS locations and update as they are relocated and removed.

***Cellular Communications Option***

Cellular service shall be provided by the Contractor. The Contractor shall supply the Engineer with a copy of the control software a minimum of 10 work days prior to the installation of the first unit. PVMSs shall be available to the Regional Transportation Management Center (TMC) for emergency incident management in the contract limits.

**METHOD OF MEASUREMENT**

Portable, variable-message signs (PVMSs) with a pay unit of each will be measured as the number of signs installed.

Portable, variable-message signs (PVMSs) with a pay unit of week will be measured as the total number of weeks provided.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of all labor, materials, and equipment necessary to complete the work, including cellular-telephone-service initial start-up and monthly charges when the cellular communications option is selected.

**ITEM 619.21XX 14 - PORTABLE, VARIABLE-MESSAGE SIGNS (LED TYPE)****ITEM 619.22XX 14 - PORTABLE, VARIABLE-MESSAGE SIGNS (HYBRID FLIP-DISK TYPE)**

Progress payments for PVMSs with a pay unit of each will be made for seventy percent (70%) of the unit price when each unit has been satisfactorily installed and is operational at the first location. The balance will be paid upon removal.

***Payment will be made under:***

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
619.2101--14	PVMS (LED)	Each
619.2102--14	PVMS (LED w/Cellular Communications)	Each
619.2103--14	PVMS (LED w/Radar)	Each
619.2104--14	PVMS (LED w/Cellular Communications& Radar)	Each
619.2111--14	PVMS (LED)	Week
619.2112--14	PVMS (LED w/Cellular Communications)	Week
619.2113--14	PVMS (LED w/Radar)	Week
619.2114--14	PVMS (LED w/Cellular Communications& Radar)	Week
619.2201--14	PVMS (Hybrid Flip Disk)	Each
619.2202--14	PVMS (Hybrid, Flip-Disk w/Cellular Communications)	Each
619.2203--14	PVMS (Hybrid, Flip-Disk w/Radar)	Each
619.2204--14	PVMS (Hybrid, Flip-Disk w/Cellular Communication & Radar)	Each
619.2211--14	PVMS (Hybrid Flip Disk)	Week
619.2212--14	PVMS (Hybrid, Flip-Disk w/Cellular Communications)	Week
619.2213--14	PVMS (Hybrid, Flip-Disk w/Radar)	Week
619.2214--14	PVMS (Hybrid, Flip-Disk w/Cellular Communication & Radar)	Week

**ITEM 11619.2298 M - TRAFFIC ENFORCEMENT AGENTS****DESCRIPTION**

Under the item, professionally trained Traffic Enforcement Agents (TEAs) from the Police Department shall be provided in order to properly maintain the flow of traffic in the vicinity of the construction site, as specified in the contract documents and as determined and ordered by the Engineer. A boiler plate of formal agreement, as developed during the design phase of the project in consultation with the NYPD shall be executed by the Contractor as a final agreement with the Traffic Control Division/Office of Construction Mitigation and Coordination-Streets (OCMC) following the award of the contract, as provided in the special provisions.

**MATERIALS**

The contractor shall arrange for TEAs to be provided by the NYCPD with a uniform readily identifiable to the traveling public. Each TEA will be equipped with all items, to be provided by NYCPD, necessary to carry out their assigned duties.

**CONSTRUCTION DETAILS**

The TEAs will be deployed to provide adequate traffic control throughout the construction site. The location, hours and days to be worked by the TEAs shall be according to contract plans or as evaluated and determined by the Engineering in Charge before the start of the contract.

**METHOD OF MEASUREMENT**

The fixed price lump sum shown in the bid proposal for this item shall be considered the price bid including equipment & uniform cost although actual payment will be based on the work performed. The fixed price lump sum is not to be altered in any manner.

It is agreed that all work shall be based on the actual number of hours that each TEA performs at a post in addition to travel time. Travel time will not exceed two hours per day. For every four TEAs on duty there shall be one relief TEA. Relief TEAs are required to provide coverage for regularly posted TEAs during their staggered lunch or dinner period and breaks. They shall be paid for actual relief hours at the same rate as the agents they are relieving that day. Total estimated costs shall include the actual cost of fringe/leave benefits for each TEA and Supervisor.

The hours of supervisory personnel will be based on a percentage basis of man-hours worked by TEAs including travel time. Supervision will consist of level 1, level II, and level III supervisors. Payment will be made based on work as follows: level 1 at 12.5%, level II at 2.5%, and level III at 1.33% of all hours worked by TEAs. Supervisory personnel hours are not subject to audit.

The hourly rate paid shall be the actual yearly salary, divided by the normal hours paid, including leave and holiday hours for TEAs and all levels of ATEAs. Those TEAs and ATEAs working overtime, including weekends and holidays will be paid one and a half times their regularly hourly rate. Those TEAs and

**ITEM 11619.2298 M - TRAFFIC ENFORCEMENT AGENTS**

ATEAs starting work prior to 8:00AM and/or working beyond 6:00PM shall be entitled to a 10% night shift differential. An additional 5% of the total hours (TEA man hours worked including travel time and supervision hours) will be allowed for bookkeeping services in processing TEA time sheets.

**BASIS OF PAYMENT**

The contract price for this item shall be a lump sum price for the work performed under this item and shall be equal to the sum total of all vouchers submitted to the Contractor by the New York City Police Department (NYCPD), as approved by the Engineer, for payment by the Contractor for the cost incurred in providing Traffic Enforcement Agents. Each TEA will be required on a daily basis to sign a time sheet showing date, time and the hours worked at each assigned location. These time sheets along with the report which shall contain the name of the agent, badge number and in-out will be submitted to the Engineer, on a daily basis, for verification. Payment under this item, will not be made until the Contractor has furnished satisfactory evidence (check etc.) to the Engineer that he has reimbursed the Police Department for said costs in providing Traffic Enforcement Agents.

The total estimated cost of this item is the "fixed sum" amount shown for this item in the Bid Schedule. No guarantee is given that the actual lump sum cost for this item will in fact be the "fixed sum" amount. The "fixed sum" amount is included in the total bid solely to insure that sufficient monies will be available to pay the Contractor for these services.

The Contractor shall maintain separate books of accounts and shall not charge any portion of the cost of Traffic Enforcement services to another part of the work.

The voucher for the payment shall be submitted to the Engineer for approval on a monthly basis and shall include the signed copies of the daily summary time sheet.

Payment for this item shall be on a monthly basis upon submission of voucher to be verified by the Engineer. Payment to NYPD shall be prompt & should be treated separately from the payment made to subcontractors.

The "fixed sum" is for bidding purposes only and shall not be varied in the bid. The contractor will be paid for the actual amount paid to NYPD and a 5% overhead as an administrative fee regardless of the fixed sum, which may be more or less than the fixed amount.

**ITEM 619.3556 - 11M      INSTALL, MAINTAIN AND REMOVE ABSORB 350**  
**TL2 SYSTEM**

**DESCRIPTION**

Under this item, the Contractor shall furnish, install, maintain, move and remove an ABSORB 350 TL2 SYSTEM at locations indicated on the Contract Plans or as ordered by the Engineer.

**MATERIALS**

The ABSORB 350 TL2 is a patented product manufactured by Barrier Systems, Inc. (180 River Road, Rio Vista, CA 94571-1208, Phone: (707)-374-6800).

The ABSORB 350 system shall be made up of the following components, and the system shall be fabricated from materials conforming to the following specifications:

1. The ABSORB 350 Energy Absorbing Element - Each element of the system shall be composed of a plastic container, steel side bars, end plate/hinge assemblies, and an evaporation prevention cap with tether and appropriate fasteners. The overall dimensions of the assembled element are 610 mm wide, 812 mm tall and 1000 mm long, as shown in the manufacturer's details. Each element of the system shall weight approximately 50 kg when empty and 325 kg when filled. The first element of the assembled system should always be empty of fluid with the evaporation prevention cap installed. All other elements of the system should be filled with fluid accordance with the installation instructions and the evaporation prevention cap shall be securely installed. All elements shall be attached in accordance with the installation instructions and drawings supplied by the manufacturer.
  - a. The plastic elements shall be molded from Linear Low Density Polyethylene.
  - b. All steel sidebars, end plate/hinge assemblies shall be fabricated from mild steel in specifications.
  - c. The evaporation prevention cap shall be molded from low density polyethylene.
2. ABSORB 350 Nose Piece - Each ABSORB 350 system shall contain one Nose Piece at the front of the system. The Nose Piece is approximately 620 mm wide, 825 mm tall and 610 mm long, as shown in the manufacturer's details. The Nose Piece shall weigh approximately 60 kg and shall be attached to the first Energy Absorbing Element in accordance with the installation instructions and drawings supplied by the manufacturer.
  - a. The Nose Piece shall be fabricated from mild steel in conformance with ASTM A-36.
  - b. The Nose Piece shall also have an aluminum skin on the front portion to provide an aesthetic cover and a place for attaching traffic control signage, if

**ITEM 619.3556 - 11M      INSTALL, MAINTAIN AND REMOVE ABSORB 350**  
**TL2 SYSTEM**

needed. This skin shall be fabricated from 5052 H32 in conformance with ASTM B209 and shall be attached to the steel portion of the Nose Piece with adhesives and pop rivets.

3.      **ABSORB 350 Transition Hardware**

a.      Transition Hardware is fabricated from mild steel in conformance with ASTM A-36 as shown in the manufacturer's details. The steel components shall weigh approximately 80 kg. The hardware shall be capable of being attached to a custom section of Safeguard Link Barrier System and/or Quickchange Moveable Barrier System that has had the front portion of the "T" top removed as shown on the manufacturer's details.

**CONSTRUCTION DETAILS**

The Contractor shall install the ABSORB 350 TL2 SYSTEM as per the manufacturer's instructions with appropriate hardware for attaching to the barrier type being protected.

- A. Attachment of the ABSORB 350™ TL2 system to the Safeguard Link Barrier System and/or Quickchange Moveable Barrier System shall require four (4) Energy Absorbing Elements. Assembly should be in compliance with the manufacturer's drawings and written instructions.
- B. The ABSORB 350™ system shall be able to be refurbished after a NCHRP 350 type impact in less than 1 hour with two people, an adequate fluid supply and refurbishment materials. The Contractor must maintain on site adequate supplies of materials for replacement/repair of parts when damaged.
- C. The ABSORB 350™ system shall not require attachment to a foundation. Attachment to the Safeguard Link Barrier System and/or Quickchange Moveable Barrier System shall be in accordance with the manufacturer's drawings and instructions.
- D. The ABSORB 350™ system shall be assembled and filled with fluid in accordance with the manufacturer's instructions. If there is a possibility that the fluid in the system could freeze due to low temperatures, proper antifreeze agents should be used in accordance with local standards.

The ABSORB 350 TL2 shall be loaded, transported to site and unloaded or moved as per the Manufacturer's instructions to prevent damage to the system.

During construction operations requiring repositioning of the temporary barriers, the ABSORB 350 TL2 shall be moved and reset in accordance with the manufacturers instructions.

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**ITEM 619.3556 - 11M      INSTALL, MAINTAIN AND REMOVE ABSORB 350  
TL2 SYSTEM**

**METHOD OF MEASUREMENT**

Measurement will be a unit price for each individual ABSORB 350 TL2 SYSTEM furnished, installed, maintained, moved and removed.

**BASIS OF PAYMENT**

This unit price shall include the cost of furnishing, installing, maintaining, moving, resetting and removing the ABSORB 350 TL2 SYSTEM including the cost of all equipment, tools, labor, services, supplies and incidentals necessary to keep it in a functional state. Any damage occurring to the system during this operation shall be the responsibility of the Contractor and shall be repaired to the satisfaction of the Engineer at no additional cost to the State. Any miscellaneous work including any work by or additional materials necessary from the Manufacturer shall also be included under this item.

**ITEM 11619.37 M - SAFEGUARD LINK BARRIER SYSTEM**

**DESCRIPTION:** Under this work, the Contractor shall furnish, install, maintain, move and remove the SafeGuard Link Barrier System at the locations indicated on the contract plans.

**MATERIALS:** The barrier system shall be the portable steel barrier system, SafeGuard Link Barrier System, manufactured by Barrier Systems, Inc. (BSI), Rio Vista California, (707) 374-6800. Any modifications from the system that was tested to the NCHRP 350 requirements, as detailed in the test report dated September 30, 2002, shall be documented and approved by the State and the FHWA prior to use of the SafeGuard Link Barrier System .

The SafeGuard Link Barrier System consists of steel safety-shape segments approximating the "New Jersey Shape," modified at the top to minimize vehicular climb. These segments, when linked together to form a longitudinal barrier, shall perform in compliance with NCHRP 350, Test Level 2( 70 km/h) or 3 (100 km/h.) Each link segment shall contain a manual and/or pneumatic raise/lower system to lift link segments onto integral internal wheels in order to move the link segments without the use of any external equipment. The wheels of the system shall be capable of allowing the individual link segments to be rolled, in any direction, on any smooth hard surface capable of supporting at least 1.4MPa. When on their wheels, the segments of the system shall be capable of being manually moved by a two person crew, without the use of any specialized equipment, and of being moved longitudinally when linked together and pulled by a construction vehicle.

Alternative movable barriers will be considered for approval. To be acceptable, they shall be approved by the FHWA and the Deputy Chief Engineer (Design) and shall have the properties indicated below:

- maximum allowable deflection in a TL-2 impact shall be less than 1.2 m, when the impact is at least 16 m from either end;
- maximum allowable deflection in a TL-3 impact shall be less than 2.1 m, when the impact is at least 32 m from either end
- movement capability similar to that of the SafeGuard Link Barrier System.

**CONSTRUCTION DETAILS:** Install the SafeGuard Link Barrier System at the locations shown on the plans in accordance with the manufacturer's instructions and the directions of the Engineer. The approach ends shall be shielded as described in the contract documents or as directed by the Engineer. In addition, the ends exposed to approaching traffic shall be flared away from the travel lane and shielded in a manner approved by the engineer to lessen the possibility of vehicular impact within the first 16 m from the approach end for a TL-2 (70 kph) impact, and within the first 32 m for a TL-3 (100 kph) impact.

The Contractor shall also move the SafeGuard Link Barrier System when and where directed by the Engineer, or as required in the contract documents.

Following installation, after each impact, and periodically, the Engineer will inspect the system. Any barrier segment having damage or defect that will adversely affect the performance of the system, in the judgement of the Engineer, shall be repaired or replaced by the Contractor to the satisfaction of the Engineer at no additional cost to the State.

The SafeGuard Link Barrier System will remain the property of the contractor, and shall be removed from the contract site at the end of this contract, or at the time approved or directed by the Engineer.

**ITEM 11619.37 M - SAFEGUARD LINK BARRIER SYSTEM**

**METHOD OF MEASUREMENT:** This work will be measured as the number of linear meters of work area along which SafeGuard Link Barrier System is satisfactorily installed, plus the additional length of barrier directed by the Engineer and satisfactorily installed as anchorage for the barrier at each individual work area. If barrier is directed to be installed along two or more sides of a work area, each side along which SafeGuard Link Barrier System is installed and its associated anchorage lengths will be measured for payment. Measurement and payment will be made only once, regardless of the number of times the barrier and associated anchorages are installed or reinstalled at any given work area side and location.

**BASIS OF PAYMENT:** The unit price bid per linear meter shall include the cost of all labor, materials, and equipment necessary for satisfactorily furnishing, installing, maintaining, repairing or replacing, moving, and removing the SafeGuard Link Barrier System. SafeGuard Link Barrier System will be eligible for progress payments in accordance with the following:

- ninety (90%) percent of the bid price upon satisfactory installation of the SafeGuard Link Barrier System,
- the remaining ten (10%) percent upon the final removal of the SafeGuard Link Barrier System from the site at the conclusion of the contract, to a different work area, or to onsite storage.

The barrier approach end attenuator, if necessary, will be paid for under separate item.

No payment will be made under the contract item for Basic Maintenance and Protection of Traffic for each calendar day during which there are substantial deficiencies in compliance with the specification requirements for SafeGuard Link Barrier System. In addition, liquidated damages will be assessed at the rate shown in Table 108-1 of §108-03 for each subsequent calendar day or part thereof that a cited deficiency under this contract item resulting in non-payment, as prescribed herein, is not corrected or is permitted to recur.

**ITEM 15619.41XXYY M - QUADGUARD - CONSTRUCTION ZONE - TERMINAL  
IMPACT ATTENUATOR**

**DESCRIPTION.** The contractor shall furnish, install, repair, maintain, move and remove QuadGuard-CZ Terminal Impact Attenuators at the locations shown on the plans or directed by the Engineer in accordance with these specifications, the approved Shop Drawings, and the directions of the Engineer.

**MATERIALS.** QuadGuard-CZ Terminal Impact Attenuators shall be manufactured by Energy Absorption Systems, Inc. of Chicago, Illinois or they shall be a terminal determined by the Regional Director to be equal thereto and be approved by the Deputy Chief Engineer, Design Division.

Each QuadGuard-CZ Terminal Impact Attenuator shall contain all external and internal parts necessary to give satisfactory service at the indicated site. QuadGuard-CZ Terminal Impact Attenuator component parts shall meet the following requirements:

- A. **Cartridges.** The cartridge boxes shall be Type I and Type II cartridge boxes and shall be of the number and arrangement required by the Manufacturer for the intended application. Cartridge boxes shall be manufactured from a weather-resistant plastic material. Type I cartridges shall contain paper honeycomb material. Type II cartridges shall contain steel honeycomb material which shall be coated to minimize the effects of corrosion.
- B. **Cartridge Brackets.** Each bay shall be equipped with cartridge brackets.
- C. **Diaphragms.** Diaphragms shall be made from 10 gage ASTM A36M steel quadruple corrugated beam. The length of each diaphragm shall be as required for each application. Two support legs shall be welded to a channel which, in turn, shall be welded to the quadruple corrugated beam. Ski shaped plates shall be welded to the bottom of the support legs. The diaphragms shall be designed to lock onto, and be guided by, an anchored and mounted center monorail support structure.  
 After fabrication, the diaphragms shall be hot-dip galvanized in accordance with ASTM A123.
- D. **Fender Panels.** Fender panels shall be fabricated from 10 gage ASTM A36M steel quadruple corrugated beam guide rail sections. Each fender panel shall be drilled and slotted so that when assembled in the field, the front end shall be bolted to a diaphragm by means of the three horizontally placed 16 mm bolts, one of which shall be a "mushroom bolt." The back end of each quadruple corrugated beam fender panel shall overlap and be connected to the fender panel of the next bay by means of mushroom bolts, which fit through the long horizontal slot in the forward fender panel and the short vertical slot in the overlapped fender panel. (The bolt shall have a nut and square washer on the inside.) This permits movement, front to back, of one set of fender panels relative to the panels in the following bay.
- E. **Monorail Assembly.** The monorail assembly shall be fabricated to the dimensions shown on the plans.
- F. **Tension Strut Back-up.** If a concrete back-up structure is not to be provided, then a tension strut back-up assembly shall be provided. The details of this assembly shall be as indicated in the plans.
- G. **Nose Cover.** The nose cover shall be made from a high density polyethylene plastic material of the color indicated in the plans or directed by the Engineer. If no color is given, color shall be yellow.
- H. **Metal Work.** All metal work, except transition panels, shall be fabricated from either M1020

**ITEM 15619.41XXYY M - QUADGUARD - CONSTRUCTION ZONE - TERMINAL**  
**IMPACT ATTENUATOR**

Merchant Quality or ASTM A36M steel. After fabrication, all metal work shall be hot dip galvanized in accordance with ASTM A123. Welding shall be in accordance with the New York State Steel Construction Manual.

- I. Fasteners.** All bolts used within the QuadGuard Terminal Impact Attenuator shall be American Standard Regular Bolts, unless indicated otherwise in the Plans. Anchor bolts shall be ASTM A193 grade B7, grouted into the concrete slab with polyester grout.
- J. Concrete.** Concrete for back-up walls and pad shall meet the requirements of Sections 501 and 555 of the Standard Specifications for Class A concrete.
- K. Reinforcing Steel.** Reinforcing steel shall conform to §709-04 Epoxy Coated Bar Reinforcement, Grade 420.
- L. Transition Panels.** Transition panels shall be fabricated from steel conforming to ASTM A36 M, hot dip galvanized in accordance with ASTM A123. Five standard transition panels shall be available. These shall be: QuadGuard-CZ to Jersey Barrier; QuadGuard-CZ to W-rail Corrugated Beam; QuadGuard-CZ to Thrie Beam; and QuadGuard-CZ End Shoe (for vertical surfaces); and QuadGuard-CZ to Single Slope Concrete Barrier.
- M. Reflectorization.** Reflectorization, consisting of Class B (High Intensity) sheeting conforming to §730-05 directly applied to aluminum sheeting, shall be affixed to the nose piece of the QuadGuard-CZ in a manner satisfactory to the engineer. Aluminum sheeting shall be 6061T6, 0.81 mm thick. The pattern and color of the reflectorization shall be as indicated on the plans.

If no pattern is provided, the pattern shall be approximately square, 450 mm on a side.

Whenever traffic is allowed to pass on both sides of the unit, the pattern shall be chevrons formed with alternating 100 mm reflectorized stripes and black opaque non-reflectorized stripes. When traffic will be permitted on only one side, the pattern shall be diagonal 100 mm stripes, downward pointing to the side traffic is to be permitted, formed as indicated above.

If no color is given, color shall be yellow.

**Acceptance.** QuadGuard-CZ Attenuator will be accepted on the basis of conformance of the QuadGuard-CZ Terminal Impact Attenuator with the approved Shop Drawings and the manufacturer's certificate of compliance with these specifications.

**CONSTRUCTION DETAILS.** Prior to ordering any materials required under this item, the Contractor shall submit two copies of the shop drawings to the Engineer for approval. Shop drawings shall show supports, connections, miscellaneous parts, concrete back-up walls or steel back-up plates, and anchorages not detailed in the plans but necessary to develop the full potential of the QuadGuard-CZ Terminal Impact Attenuator. In addition to the above, the Contractor shall deliver to the Engineer two (2) copies of Design Manuals, Installation Manuals, and Maintenance Manuals prepared for the product. The Contractor shall install the QuadGuard-CZ Terminal Impact Attenuator only after approval of the above shop drawings and authorization from the Engineer to do so.

QuadGuard-CZ shall be built either on existing concrete pad minimum 150 mm deep or existing 150 mm minimum asphalt (type 6 or 7) over 150 mm minimum compacted subbase (minimum 95% of maximum theoretical density). If neither situation exists, then a concrete pad (minimum 200 mm deep) shall be built as per manufacturer's instructions.

The Contractor shall construct the concrete pad, if required, and back-up structure at the locations

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IMPACT ATTENUATOR**

shown, or directed, to the dimensions indicated in the approved shop drawings. Steel Tension Strut Backup Assemblies shall be used, except, when protecting concrete piers, concrete parapets, concrete walls, or other rigid objects, either the Steel Tension Strut Backup Assembly or the Concrete Backup Assembly, at the option of the Contractor, shall be used. The appropriate standard transition or, if none of the standard transitions is appropriate, a special transition piece shall be furnished and installed.

QuadGuard-CZ Terminal Impact Attenuators shall bear upon prepared surfaces as shown in the plans. Necessary site preparation shall be performed in accordance with, and included under, their respective items.

To minimize exposure of vehicular traffic to the possibility of impact on the back-up structure, the Contractor shall complete the attenuator installation within seven (7) calendar days after completion of the back-up structure.

Traffic protection devices, such as cones, drums, lights, signs, barricades, or other articles directed by the Engineer, shall be provided and maintained under their respective items. Those devices shall not be removed until the QuadGuard-CZ Terminal Impact Attenuator is fully operational, and, in lighted areas or areas to be lighted, these articles shall also be maintained until the lighting system is operational.

The Contractor shall be required to maintain the QuadGuard-CZ Terminal Impact Attenuator and shall be responsible for a continuous 24 hour operation. If for any reason an attenuator is out of operation the Contractor shall provide delineation, as described above, acceptable to the Engineer until repairs are made or a new attenuator installed.

QuadGuard-CZ shall be moved to another location or removed from the project site as shown in the plans or as directed by the Engineer. When the QuadGuard-CZ is removed from a location and the concrete/asphalt foundation is left in place, the anchors shall be removed from the foundation and the damaged areas repaired with concrete/asphalt as directed by the Engineer. If a portable concrete pad was placed at the location or a new concrete pad was built, then the foundation shall be removed along with the QuadGuard-CZ and the area restored to match the surrounding area as directed by the Engineer.

**METHOD OF MEASUREMENT.** The work will be measured as the number of QuadGuard Terminal Impact Attenuators of the specified width and number of bays satisfactorily furnished, installed and removed in accordance with these specifications, the plans, approved shop drawings, and the directions of the Engineer. *Note: The plastic nose assembly and its Type I cartridge are not counted in determining the number of bays when installing a new attenuator.*

**BASIS OF PAYMENT.** The requirements of section 619-5 Basis of Payment shall apply as if the words "impact attenuators" and "crash terminals" are included in the list of items in lines 5 through 8 and lines 16 through 20.

The unit price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily erect, maintain, repair and remove an attenuator. The unit price bid shall include the metal or concrete back-up system, the concrete pad if indicated, and necessary materials to fasten the QuadGuard - CZ Terminal Impact Attenuator to the protected feature. Site preparation and maintenance and protection of traffic will be paid for separately under their respective items.

Repair of attenuators damaged by public traffic shall be paid for by dividing the unit bid price by the number of bays plus one, of the damaged attenuator and multiplying the resulting figure by the number

**ITEM 15619.41XXYY M - QUADGUARD - CONSTRUCTION ZONE - TERMINAL  
IMPACT ATTENUATOR**

of bays damaged. Nose units, if damaged, shall be considered to be a bay. No payment will be made to the Contractor for repair or replacement of any attenuator damaged by the Contractor's operations.

Whenever the Engineer directs that the attenuator be moved to a new location, payment will be made in the same manner as if it were a new attenuator. Minor movements within a single site, such as movements to realign, adjust, maintain, etc., will not be considered as a movement to a new location and will not entitle the Contractor to additional payment.

After an attenuator is placed and is operational, payment will be made for ninety (90) percent of the unit bid price, the remaining ten (10) percent will be paid upon removal.

*Payment will be made under:*

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
15619.41XXYY M	QuadGuard - Construction Zone - Terminal Impact Attenuator, XX Width Class, YY Bays	Each

*where: XX is the width class of the QuadGuard-CZ Terminal Impact Attenuator. Width class corresponds to the actual width, in inches, measured at the diaphragms. YY is the number of bays. XX may take on values of 24, 30, 36, 69, and 90. YY may take on values of 03, 04, 05, 06, 09.*

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**ITEM 11619.6070 M - CHAIN LINK FENCING ON TEMPORARY CONCRETE  
BARRIER 1520mm HIGH**

**DESCRIPTION:**

This work shall consist of the construction and removal of 1520 mm high chain-link fencing with top tension wire on top of the temporary concrete barrier or at locations as shown on the plans in accordance with these specifications, the Contract Plans, and the appropriate Standard Sheets.

**MATERIALS:**

Materials shall conform to Subsection 607-2 of the Standard Specifications (Metric Edition). Used material in good condition may be used. The Engineer shall be the sole judge of the acceptability of condition.

**CONSTRUCTION DETAILS:**

Construction details shall conform to Subsection 607-3 of the Standard Specifications (Metric Edition), Standard Drawing 607-11 and as shown on the plans. Upon removal, the chain-link fence shall become the property of the Contractor and shall be removed by him from the project site.

**METHOD OF MEASUREMENT:**

The quantity to be paid for will be the number of linear meters of chain-link fencing measured along the top of the fencing, center to center of end posts, properly furnished and installed in accordance with the plans, specifications, standard sheets and directions of the Engineer.

**BASIS OF PAYMENT:**

No separate payment will be made for relocating chain-link fencing on top of temporary concrete barriers that are relocated in accordance with the maintenance and protection of traffic plans. The unit price bid per linear meter shall include the cost of all labor, materials, tools, and equipment necessary to satisfactorily complete the work and shall include repair of material damaged by the Contractors operations and all other necessary materials.

**ITEM 11619.607244 M – TEMPORARY CHAIN LINK FENCING GROUND MOUNTED. 2.44 m HIGH**

**Description:**

Under this item, the Contractor shall furnish, install, maintain, relocate and remove 2.44 m high, ground mounted chain-link fencing with top tension wire at locations as shown on the plans or as ordered by the Engineer in accordance with these specifications, the Contract Plans, and the appropriate Standard Sheet.

**Materials:**

Materials shall conform to Subsection 607-2 of the Standard Specifications (Metric Edition). Used material in good condition may be used. The Engineer shall be the sole judge of the acceptability of condition.

**Construction Details:**

Construction details shall conform to Subsection 607-3 of the Standard Specifications (Metric Edition), Standard Drawing M607-11 and as shown on the plans. Upon final removal, the chain-link fence shall become the property of the Contractor and shall be removed by him from the project site.

**Method of Measurement:**

The quantity to be paid for will be the number of linear meters of chain-link fencing measured along the top of the fencing, center to center of end posts, properly furnished installed, maintained, relocated and removed by the Contractor in accordance with the plans, specifications, standard sheets and directions of the Engineer.

**Basis of Payment:**

No separate payment will be made for relocating chain-link fencing in accordance with the maintenance and protection of traffic plans. The unit price bid per linear meter shall include the cost of all labor, materials, tools and equipment necessary to satisfactorily complete the work and shall include repair of material damaged by the Contractor's operations and all other necessary materials.

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**ITEM 11619.607488 M - TEMPORARY CHAIN LINK FENCE GATE 4.88 m WIDTH,  
2.44 m HEIGHT**

**Description:**

This work shall consist of the furnishing, installation and removal of chain-link fencing gates with top tension wire at locations shown on the plans. The work shall be in accordance with these specifications, the contract plans and the appropriate standard sheets.

**Materials:**

Materials shall conform to Subsection 607-2 of the Standard Specifications (Metric Edition). Used material in good condition may be used. The Engineer shall be the sole judge of the acceptability of condition.

**Construction Details:**

Construction details shall conform to Subsection 607-3 of the Standard Specifications (Metric Edition), Standard Drawing M607-12 and as shown on the plans.

The number, direction of opening and widths of leaves for gates shall be as shown in the plans.

Upon removal, the gate shall become the property of the Contractor and shall be removed by him from the project site.

**Method of Measurement:**

The quantity to be paid for will be the number of fence gates with top tension wire furnished, installed and removed in accordance with the plans, specifications, standard sheets and as directed by the Engineer.

**Basis of Payment:**

The unit price per gate shall cover the cost of furnishing, installing and removing each gate assembly including labor, materials, tools and equipment necessary to satisfactorily complete the work and repair of material damaged by the Contractor's operations.

**ITEM 11619.6075 M - RELOCATION OF TEMPORARY CONCRETE BARRIER**

**Description:** The contractor shall relocate, move and align existing temporary concrete barriers where indicated on the plans, or where directed by the Engineer.

**Materials:** None specified.

**Construction Details:** Each run or bay of temporary concrete barrier units shall have to be fastened together to form a continuous chain. After placement each successive unit shall be moved longitudinally to remove the slack in the joint between the units. The units at each end of a run or bay shall be anchored as shown on the standard sheet. All construction work shall comply with the standard sheet for TEMPORARY CONCRETE BARRIER. Where shown on the plans or directed by the Engineer, the ends of the barrier run shall be fitted with a tapered end section, or flared back.

All damaged barriers not suitable for the public safety zone, as determined by the Engineer shall be transported by the Contractor and stored at a site selected by the Engineer.

**Method of Measurement:** This work will be measured as number of meter of temporary concrete barrier relocated in accordance with contract documents and directions of the Engineer. Temporary concrete barrier will be measured along the centerline of uppermost surface.

**Basis of Payment:** The unit price bid per meter for relocation of temporary concrete barrier shall include all material, equipment, and labor necessary to relocate, move, align and transport to existing temporary barrier including any required connection devices, end treatments, or guiding devices, removal of devices for pinning and connecting temporary precast concrete barrier units. Any movement of temporary concrete barrier to the proposed new barrier location, except movements necessary to realign or replace damaged units, will be considered as a movement to new location and the Contractor will be entitled to payment for the movement.

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**ITEM 10619.6701 M - TEMPORARY HIGHWAY LIGHTING SYSTEM**

**DESCRIPTION:**

Under this item the Contractor shall furnish, install, maintain and remove temporary lighting assemblies, wire, poles, connections to permanent lighting systems and power sources at locations shown on the plans or as ordered by the Engineer.

This item is to furnish temporary highway lighting, as needed, during construction to supplement the permanent roadway lighting system in achieving an uninterrupted lighted roadway surface.

**MATERIALS:**

All materials shall be new.

The luminaires shall be 250 Watt or 400 Watt High Pressure Sodium Vapor mounted on 2 meter or 4.25 meter long bracket arms as indicated on the plans or as determined by the Engineer.

The luminaire shall be of the high pressure sodium vapor type designed for use with a horizontally mounted high pressure sodium vapor lamp, and shall be fully weather proof.

The luminaire and lamp combination shall produce a Type I, II or III light distribution conforming to IES Standards.

The luminaires shall be equipped with a built-in ballast for wattage and operating voltage shown on the plans.

The components comprising the assembly of the upper half of the luminaire shall include a reflector, a porcelain enclosed mogul socket, and a twist-lock three prong receptacle for a photoelectric control (where required).

Wood poles shall be preservative treated temporary timber poles (ANSI O 5.1, Class 4) and be of a length such that the mounting height and embedment depth shown on the plans is achieved.

Multiple lighting wire and ground wire shall conform to subsection 723-70 and 723-75 respectively.

**CONSTRUCTION DETAILS:**

Temporary lighting assemblies, poles and wires shall be furnished, installed, maintained, repaired, replaced as necessary and energized at locations shown on the plans or as chosen by the

**ITEM 10619.6701 M - TEMPORARY HIGHWAY LIGHTING SYSTEM**

Engineer.

The permanent lighting equipment may be installed and used for temporary lighting when approved by the Engineer.

Detour pavement shall not be opened to traffic until the temporary roadway lighting is installed and operating to the satisfaction of the Engineer.

In no case shall the existing lighting system be discontinued until the temporary lighting is in service and approved. Temporary lighting of lower intensity than indicated on the plans will not be permitted.

Temporary Highway Lighting System shall be connected to and operated by the permanent lighting system and shall contain luminaires with photoelectric cells. Nonconforming items and/or installation shall be approved by the Engineer prior to placement.

Contractor shall make connections to existing permanent lighting systems, controllers or other power sources. Coordination with local utility is the responsibility of the Contractor.

Work and testing shall conform to subsections 670-3.14, 670-3.15 and 670-3.16.

In the event that the Contractor fails to restore complete operation of any portion of the temporary roadway lighting system within 24 hours of any failure, the State may direct its own maintenance contractor to make repairs in the interest of safety. The Contractor shall reimburse the State for all costs it incurred in restoring the lighting system.

If the Contractor proposes an alternate temporary roadway lighting system, the Contractor shall then submit shop drawings for New York State Department of Transportation review and approval.

Once the permanent highway lighting is installed and in operation, the temporary lighting assemblies, wires and poles shall be dismantled and removed from the site.

**METHOD OF MEASUREMENT:**

Payment for Temporary Highway Lighting System will be made on a lump sum basis.

**BASIS OF PAYMENT:**

The lump sum price bid for this item shall include the cost of all equipment, materials and labor necessary to adequately and safely maintain the minimum light level indicated on the plans.

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**ITEM 10619.6701 M - TEMPORARY HIGHWAY LIGHTING SYSTEM**

All maintenance costs related to the temporary highway lighting system shall be included in this item.

Power costs for the temporary lighting system will be borne by New York State Department of Transportation.

In the event the contract completion date is extended, no additional payment will be made for temporary highway lighting.

Monthly progress payments will be made for this item in proportion to the amount of contract work completed less any deductions for disbursements incurred restoring the temporary lighting.

**ITEM 15619.6730 M - LIGHTING FOR NIGHTTIME OPERATIONS**

**DESCRIPTION** This work shall consist of furnishing, installing, operating, maintaining, moving and removing portable light towers and equipment-mounted lighting fixtures for nighttime construction operations, for the duration of nighttime work on the contract. Nighttime operations consist of work specifically scheduled to occur after sunset and before sunrise.

**MATERIALS**

None specified.

**CONSTRUCTION DETAILS**

**General** - Before nighttime operations may begin; (1) an acceptable lighting plan must be submitted and (2) all required lighting equipment and/or materials must be ready for operation.

**Lighting Plan** - Thirty days prior to the start of night work, the Contractor shall submit a lighting plan to the Engineer. The lighting plan shall include the following:

- Layout plan showing location of light towers, including both typical spacing and lateral placement.
- Description of light towers to be used.
- Description of electrical power source.
- Attachment and mounting details for lights to be attached to equipment.
- Specific technical details on all lighting fixtures to be provided, including power rating and photometric charts.
- Details on any hoods, louvers, shields, or other means to be used to control glare.
- Lighting calculations confirming that the illumination requirements will be met by the layout plan.

The layout plan shall be on U.S. standard D size sheets (559 mm x 864 mm) at an appropriate scale to adequately describe the work. It shall clearly show the location of all lights necessary for every aspect of work to be done at night.

In addition to the plan sheets, the Contractor shall submit catalog cuts giving the specific brand names, model numbers and ratings of the lighting equipment. The submittal shall include power ratings and

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photometric data.

**Light Levels** - Tower-mounted luminaires, whether portable, trailer-mounted, or equipment-mounted, shall be of sufficient wattage and/or quantity to provide an average maintained horizontal illuminance equal to or greater than the following over the work area:

Level I	-	50 lx
Level II	-	100 lx
Level III	-	200 lx

The uniformity of illuminance, defined as the ratio of the average illuminance to the minimum illuminance over the work area, shall not exceed 5:1.

**Illuminance Requirements** - Lighting shall be adequate to meet the required level of illuminance and uniformity over the entire area of operation as follows:

- Level I - All areas of general construction operations including excavation; cleaning and sweeping; landscaping; planting and seeding. Level I shall also be provided at the area of lane and/or road closures continuously throughout the period of closure, including the setup and removal of the closures.
- Level II - Asphalt paving, milling, and concrete placement and/or removal.
- Level III - Pavement or structural crack filling, joint repair, pavement patching and repairs, installation of signal equipment or other electrical/mechanical equipment, and other tasks involving fine details or intricate parts and equipment.

For paving and milling operations, including bridge decks, Level II illuminance shall be provided 15 m ahead of and 30 m behind the paving or milling machine. In addition, Level I illuminance shall be provided a minimum of 120 m ahead and 240 m behind the paving or milling machine, or for the entire area of concrete placement or pavement work if less than this distance. This area shall be extended as necessary to incorporate all vehicle and equipment operations associated with the paving operation. The only exception to the requirement for Level I illumination throughout the area of construction operations is that finish rollers can work beyond the area of Level I illumination using floodlights mounted on the roller.

Construction operations shall be deemed to include all work operations by contractor's personnel, including layout and measurements ahead of the actual work.

**Equipment** - All lighting equipment will be furnished as required and retained by the Contractor after the work is completed. Material and/or equipment shall be in good operating condition and in compliance with applicable safety and design codes.

**Lighting Fixtures** - Lighting fixtures shall consist of portable ground-mounted or trailer-mounted light towers; light towers affixed to paving machines, finishing machines, and milling

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machines; and floodlights mounted on construction equipment.

Flood lights mounted on construction equipment shall consist of a minimum of two 500 W flood lights facing in each direction to provide a minimum of 10 lx of horizontal illuminance measured 20 m in front of and behind the equipment. Construction equipment that is operating solely in areas illuminated by tower lighting shall not require floodlights.

**Portable Generators** - The contractor shall provide portable generators to furnish adequate AC power to operate all required lighting equipment. Fuel tank capacity and availability of fuel on site shall be sufficient to permit uninterrupted operation throughout the planned shift. Adequate switches shall be provided to control the various lights. All wiring shall be weatherproof and installed according to local, State, Federal and OSHA requirements. All power sources shall be equipped with a Ground-Fault Circuit Interrupter to prevent electrical shock.

**Light Meter** - The Contractor shall furnish, for the use of the Engineer, a photometer capable of measuring the level of illuminance. This photometer shall be available to the Engineer for use as necessary to check the adequacy of illumination throughout the nighttime operations.

**Equipment Mounting** - The Contractor shall provide suitable brackets and hardware to mount lighting fixtures and generators on machines and equipment. Mountings shall be designed so that light fixtures can be aimed and positioned as necessary to reduce glare and to provide the required illuminance. Mounting brackets and fixtures shall not interfere with the equipment operator or any overhead structures, and shall provide for secure connection of the fixtures with minimum vibration.

**Portable and Trailer-Mounted Light Towers** - Light towers shall be provided as the primary means of illumination, and shall provide Level I illuminance throughout the work area. They shall be supplemented to the extent necessary by lighting fixtures mounted on construction equipment to provide Level II or Level III illuminance where required. Towers shall be sturdy and free-standing without the aid of guy wires or bracings. Towers shall be capable of being moved as necessary to keep pace with the construction operation. Portable towers and trailers shall be positioned to minimize the risk of being impacted by traffic on the roadway or by construction traffic or equipment.

**Light Towers on Paving, Milling, and Finishing Machines** - If needed to supplement portable and/or trailer-mounted light towers, towers shall be affixed to paving, milling, and finishing machines to provide the required level of illuminance for the specified distance in front of and behind the machine. Machine mounted light towers shall not exceed a height of 4 m above ground. Luminaires shall be aimed and adjusted to provide uniform illumination with a maximum uniformity ratio of 5:1. The hopper, auger, and screed areas of pavers shall be uniformly illuminated. The operator's controls on all machines shall be uniformly illuminated.

**Equipment Lights** - All construction equipment, including rollers, backhoes, loaders, and other equipment operating in work areas not illuminated to a minimum of Level I illuminance shall be equipped with floodlights as described above. Whether or not floodlights are provided, all construction equipment shall be equipped with conventional vehicle headlights to permit safe movement in non-illuminated areas. Headlights shall not be permitted as the sole means of illumination while working.

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**Glare Control** - All lighting provided under this item shall be designed, installed, and operated to avoid glare that interferes with traffic on the roadway or that causes annoyance or discomfort for residences adjoining the roadway. The contractor shall locate, aim, and adjust the lighting fixtures to provide the required level of illuminance and uniformity in the work area without the creation of objectionable glare. The Engineer shall be the sole judge of when glare exceeds acceptable levels, either for traffic or for adjoining residences.

The contractor shall provide shields, visors or louvers on luminaires as necessary to reduce objectionable levels of glare. As a minimum, the following requirements shall be met to avoid objectionable glare on roadways open to traffic in either direction:

- Tower-mounted luminaires shall be aimed either generally parallel or perpendicular to the roadway.
- All luminaires shall be aimed such that the center of the beam axis is no greater than 60° above the vertical.
- No luminaires shall be permitted that provide a luminous intensity greater than 20 000 cd at an angle of 72° above the vertical.

**Existing Roadway Lights** - Existing street and highway lighting shall not eliminate the need for the contractor to provide lighting. Consideration may be given to the amount of illumination provided by existing lights in determining the wattage and/or quantity of lights to be provided. Such consideration shall be discussed in the Contractor's lighting plan.

**Continuous Operation** - The Contractor shall provide sufficient fuel, spare lamps, generators, and qualified personnel to ensure that all required lights will operate continuously during nighttime operation. In the event of any failure of the lighting system, the operation shall be discontinued until the required level of illumination is restored.

**Traffic Control Areas** - Level I illuminance shall be provided during the setup of lane closures or road closures installed in conjunction with nighttime construction operation and shall be maintained until the closure is removed. Such lighting shall be required at the actual points of closure, including the lane closure tapers. Lighting shall not be required throughout the entire lane closure, except as required at work areas.

**METHOD OF MEASUREMENT**

Payment for lighting for nighttime operations will be made on a lump sum basis.

**BASIS OF PAYMENT**

The lump sum price bid for portable lighting shall include all equipment, materials, and labor necessary to provide, install, operate, and maintain illumination of the nighttime work areas and associated traffic

**ITEM 15619.6730 M - LIGHTING FOR NIGHTTIME OPERATIONS**

control operations.

Payment will be made at the lump sum price bid as follows:

- Ten percent when the lighting plan has been accepted and satisfactory lighting of nighttime operations has begun.
- The remaining ninety percent will be paid in progress payments per calendar day of nighttime operations completed. The amount of such calendar day payment will be determined by dividing ninety percent of the lump sum amount bid by the total number of days of nighttime operations included in the contractor's current schedule of operations.

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- ITEM 15619.6801 M - TEMPORARY INERTIAL BARRIER MODULE (90 KILOGRAMS)**
- ITEM 15619.6802 M - TEMPORARY INERTIAL BARRIER MODULE (180 KILOGRAMS)**
- ITEM 15619.6803 M - TEMPORARY INERTIAL BARRIER MODULE (320 KILOGRAMS)**
- ITEM 15619.6804 M - TEMPORARY INERTIAL BARRIER MODULE (640 KILOGRAMS)**
- ITEM 15619.6805 M - TEMPORARY INERTIAL BARRIER MODULE (960 KILOGRAMS)**

**DESCRIPTION.** The Contractor shall furnish, install, maintain, relocate and remove Temporary Inertial Barrier Modules at locations and in configurations shown on the plans, in accordance with the manufacturer's specifications, and as approved by the Engineer.

**MATERIALS.** The materials shall meet the requirements specified in the following:

Sodium Chloride	712-03
Inertial Barrier Modules	712-07
Aluminum Sign Panels	730-01

**CONSTRUCTION DETAILS.** The unit weight of the fill sand, as supplied, shall result in the desired module sand weight, plus or minus 10 percent. Sodium chloride, as dry rock salt, equal to 3-5 percent by weight of the sand, shall be thoroughly mixed into the sand. The sand and salt mixture shall be placed loose, not in bags or sacks, in the plastic barrels (inertial barrier modules). When called for in the plans, reflectorized aluminum clearance marker panels shall be suitably attached to the front face of the nose module of the completed installation.

If the plans indicate that the site necessitates securing of the modules, the work shall be performed as recommended by the manufacturer and approved by the Engineer. If an overall covering for the debris is called for, a device shall be provided and installed as recommended by the manufacturer, and approved by the Engineer. Modules or components damaged by public traffic, shall be repaired or replaced in a manner approved by the Engineer, and within a time limit stated in writing by the Engineer. Maintenance and protection of traffic shall be carried out in accordance with the traffic plan shown in the plans. Traffic protection devices, which may include cones, signs, barricades, etc., shall be provided under their respective items. These devices shall not be removed until the Temporary Inertial Barrier Module Installation is fully operational.

**METHOD OF MEASUREMENT.** Temporary Inertial Barrier Modules shall be measured by the number of each type properly installed.

**BASIS OF PAYMENT.** The unit price of each type of Temporary Inertial Barrier Module shall include the cost of furnishing all labor, materials, and equipment necessary to complete the module installation. Replacement of individual modules damaged by public traffic will be paid for at the unit price bid for each Temporary Inertial Barrier Module. Payment will be made for each module in its first instance installation as follows: Ninety percent (90%) upon installation of the complete array. Ten percent (10%) upon the final removal of the array. Relocation of modules to a new array will be paid for as a new installation. Necessary site preparation, traffic protection devices and reflectorized clearance marker panels shall be paid under their respective items.

**ITEM 11619.9001 M - TOW TRUCK SERVICE**

**Description:** Under this item, the Contractor shall provide tow truck service for emergency removal of all disabled vehicles with the exception of vehicles owned or operated by the Contractor as detailed in the contract documents or as directed by the Engineer.

**Materials:** The Contractor shall provide tow trucks equipped with an amber cab mounted flashing light, two-way radio capable of operating on the police band, tow rig, cushioned bumper and rear pintle hooks.

**Service Requirements:** The Contractor, in providing tow truck service, may utilize one of two options available as follows:

**A. Towing Service Company**

The towing service may be furnished by a company that meets the approval of the New York State Department of Transportation.

**B. Contractor Towing Service**

Towing service may be provided by the Contractor. Vehicles provided by the Contractor for tow truck service must be approved by the State, and meet the same criteria and standards established by the State relative to vehicle requirements, and operational and safety equipment that are used in granting authorized tow truck service.

Tow truck vehicles shall only be operated by drivers who have demonstrated knowledge and capability for operating the vehicles.

**Construction Details:****Stationed Towing Service**

- A. The towing truck service shall be furnished and stationed at the location specified by the Engineer. The tow truck shall be stationed to expedite removal of disabled vehicles and shall be on duty during periods specified elsewhere in the contract documents.
- B. The tow truck service may also be required to provide towing service during other periods of anticipated heavy traffic flow as determined by the Engineer. Notice of requiring this service shall be given to the Contractor 24 hours in advance.

Disabled vehicles shall be towed to the nearest acceptable location approved by the Engineer. The location shall be selected such that the operators of the disabled vehicles may readily obtain or arrange to obtain further service at their own expense. Upon delivery of the disabled vehicle

**ITEM 11619.9001 M - TOW TRUCK SERVICE**

to the approved location, the tow truck shall be required to immediately return to its assigned duty station, thus providing maximum towing coverage during specified hours.

The operators of disabled vehicles shall not be charged for the Towing Service provided under this item.

The tow truck may be called to the scene by police, the Contractor or the Engineer. The tow truck must respond and arrive at the scene of the disabled vehicle no later than 10 minutes after receipt of the call. The Contractor must provide 10 minute response service even though there may be multiple disabled vehicles at different locations within the limits of the contract. In the case of serious vehicular accidents, the tow truck must not remove the disabled vehicle or vehicles until authorized by the police or by the Engineer.

**Method of Measurement:** This service will be measured by the number of hours that a tow truck and operator are on duty as ordered by the Engineer.

**Basis of Payment:** The unit price bid per hour shall include the cost of all labor, insurance, tools, equipment, and materials necessary to provide the towing service. The hourly rate price bid shall include the cost of a fully functional tow truck and operator.

No payment will be made for any hour of required duty that the tow truck is on duty.

Should the Contractor not provide the specified tow truck during the required hours of duty, the Engineer shall arrange for towing of all disabled vehicles from the project site to an approved location and such towing charges shall be deducted from monies owed to the Contractor by the State.

**ITEM 11619.9011 M - TOW TRUCK SERVICE (HEAVY)**

**DESCRIPTION:** Under this item, the Contractor shall furnish Tow Truck Service for emergency removal of disabled vehicles from the contract site as detailed in the Contract Documents or as directed by the Engineer.

**SERVICE REQUIREMENTS:**

The Contractor, in providing tow truck service, may utilize one of two options available as follows:

- A. Towing Service Company - The towing service may be furnished by a company authorized to provide such services on the Gowanus Expressway or by a company that meets the approval of the New York State Department of Transportation.
- B. Contractor Towing Service - Towing service may be provided by the Contractor. Vehicles provided by the Contractor for tow truck service must be approved by the State, and meet the same criteria and standards established by the State relative to vehicle requirements, and operational and safety equipment that are used in granting authorized tow truck service.

Tow truck vehicles will only be operated by drivers who have demonstrated knowledge and capability for operating the vehicles.

Heavy Tow Truck shall be capable of towing a tractor and trailer of the classification and weight that operates on this section of the Expressway.

**CONSTRUCTION DETAILS:****Stationed Towing Service**

- A. The tow truck with operator(s) shall be furnished and stationed at the location specified by the Engineer, and as indicated in the Plans or in Proposal. The tow truck shall be stationed to expedite removal of disabled vehicles and shall be on duty during periods specified elsewhere in the contract documents.
- B. The tow truck with operator(s) may also be required to provide towing service during other periods of anticipated heavy traffic flow as determined by the Engineer. Notice of requiring this service shall be given to the Contractor 24 hours in advance.

Disabled vehicles shall be towed to the nearest acceptable location approved by the Engineer. The location shall be selected such that the operator of the disabled vehicle may readily obtain or arrange to obtain further service. Upon delivery of the disabled vehicle to the approved location, the tow truck shall be required to immediately return to its assigned duty station, thus providing maximum towing coverage during the specified duty hours. Expressway patrons shall not be charged for the Towing Service provided under this item.

- C. The tow truck shall be equipped with a two-way radio capable of operating on the police band.

**METHOD OF MEASUREMENT:** Payment will be made for each hour or portion thereof that a tow

**ITEM 11619.9011 M - TOW TRUCK SERVICE (HEAVY)**

truck and operator is on duty as detailed in the Plans or Proposal.

**BASIS OF PAYMENT:** The unit price bid per hour shall include the costs of all labor, equipment and materials necessary to provide the towing service. The hourly rate price bid shall include the cost of a fully functional tow truck and operator.

The Contractor shall be required to provide the specified tow truck for each hour of required duty. No payment will be made for any hour or portion thereof of required duty that the tow truck is not on duty.

Should the Contractor not provide the specified tow truck during the required hours of duty, the Engineer shall arrange for towing of any disable vehicle from the project site to an approved location and such towing charges shall be deducted from monies owed to the Contractor by the State.

Payment will be made under:

<u>Item</u>	<u>Description</u>	<u>Pay Unit</u>
11619.9917 M	Tow Truck Service (Heavy)	HR

**ITEM 11626.01 M - FURNISH AND INSTALL NEW MONUMENT - BPM****ITEM 11626.02 M - FURNISH AND INSTALL NEW MONUMENT CASTING - BPM****DESCRIPTION**

Under these items, the Contractor shall furnish and install new survey control monuments complete with new castings or furnish and install new monument castings over existing monuments, where applicable.

**MATERIALS**

New monuments shall be constructed and established in accordance with the contract documents and requirements of the office of the Borough President, Topographic Bureau. The casting shall be Grade 30 Grey Cast Iron in accordance with the Contract Drawings and requirements of the Office of the Borough President, Topographic Bureau.

**CONSTRUCTION DETAILS**

All monuments that will, or may be disturbed by construction operations should be carefully referenced in the presence of a representative of the Topographic Bureau, if possible, or the Engineer. The Topographic Bureau shall be notified 5 business days before referencing and 5 business days before removal of any monument. There shall be a minimum of three (3) substantial tie points sufficiently removed so there is no chance of their being disturbed during construction operations.

Prior to placing new monuments, the Topographic Bureau shall be advised of the date proposed for placement. The monument shall be set in accordance with Section 626-3 of the Standard Specifications and in accordance with the details shown on the Contract Drawings. Careful notes should be kept of the references and the notes shall be witnessed by two people, one of whom is a licensed, registered Professional Land Surveyor. If the monument is set at a different or new location, it shall be located from three monuments which were undisturbed during the construction. As soon as the monument is set, a report shall be written to the Topographic Bureau describing the work with the computations for the coordinates of the monuments at different or new locations or the ties used to set monuments at existing locations included.

The monument cover/casting shall be set on a concrete collar, in the sidewalk concrete. If a special sidewalk is being placed, an area of sidewalk concrete shall be placed around the monument as directed by the Engineer.

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**ITEM 11626.01 M - FURNISH AND INSTALL NEW MONUMENT - BPM**

**ITEM 11626.02 M - FURNISH AND INSTALL NEW MONUMENT CASTING - BPM**

**METHOD OF MEASUREMENT**

These items shall be measured as the number of new monuments with new castings constructed or the number of new monument castings installed, in conformance with the Contract Drawings and the instructions of the Engineer.

**BASIS OF PAYMENT**

The unit price for these items shall include all labor, materials and equipment necessary to perform the work except that sidewalk concrete shall be paid for under its appropriate item.

**ITEM 11626.01 M - FURNISH AND INSTALL NEW MONUMENT - BPM**

**ITEM 11626.02 M - FURNISH AND INSTALL NEW MONUMENT CASTING - BPM**

These items shall be measured as the number of new monuments with new castings constructed or the number of new monument castings installed, in conformance with the Contract Drawings and the instructions of the Engineer.

**Basis of Payment:**

The unit price for these items shall include all labor, materials and equipment necessary to perform the work except that sidewalk concrete shall be paid for under its appropriate item.

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**ITEM 634.000106--11 – Maintenance and Repair of Elevator for the Liberty Street Bridge Extension.**

**DESCRIPTION**

This work consists of performing maintenance and repair of the elevator at the Liberty Street Bridge Extension for the durations herein described.

The Special Note entitled “Liberty Street Bridge Extension Preventative Maintenance and Repair Requirements” provides additional information and requirements regarding the work to be performed under this item.

**MATERIALS**

The same materials used in the existing installation shall be used in the maintenance and repair work. Any materials that require replacement shall be replaced in kind with new material of the exact type used in the existing installation, except that substitutions may be requested and are subject to approval by the Engineer. Certified copies of the manufacturer’s test results shall be submitted to the Engineer.

Refer to the Special Note entitled “Liberty Street Bridge Extension Preventative Maintenance and Repair Requirements” for additional materials requirements.

**CONSTRUCTION DETAILS**

The Contractor shall engage the services of an elevator company registered with the International Union of Elevator Constructors (I.U.E.C.) and licensed as Professional Engineers to practice in New York State for the repair and maintenance of elevators.

The Contractor shall perform all maintenance and repair of the four vertical transportation elements, as detailed in the Special Note entitled “Liberty Street Bridge Extension Preventative Maintenance and Repair Requirements”.

**ITEM 634.000106--11 – Maintenance and Repair of Elevator for the Liberty Street Bridge Extension.**

The work shall commence from a date ten working days after the "Notice to Proceed" is issued until December 31, 2009. The work shall be performed in a manner and sequence that minimizes the duration that the elevators and/or escalators are out of service. The Contractor shall be responsible for the workmanship, upkeep and safety of the elevators and escalators during the maintenance, repair and operation period as herein defined.

**METHOD OF MEASUREMENT**

The work will be measured as the number of calendar months, measured to the nearest ¼ of a month that the elevator is fully in service and available to the public.

Measurement of the work shall commence on a date ten working days after the "Notice to Proceed" is issued and continue until December 31, 2009.

Deductions for non-performance shall be withheld in accordance with the provisions of Section 3.15 *Performance Standards* of the Special Note "Liberty Street Bridge Extension Preventative Maintenance and Repair Requirements".

Work under these Items may be terminated by written notification by the Engineer prior to expiration of the Contract. When directed in writing by the Engineer, payment for each month's service under these Items after the expiration date of the original Contract will be made as part of the final estimate, in accordance with the stipulations of this Item as defined herein.

**BASIS OF PAYMENT**

The unit price bid per month for this work shall include the cost of furnishing all labor, materials, equipment, fuel, power, lubrication, registration permits, and other incidentals necessary to maintain, repair and operate the elevator.

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ITEM 11634.06 M - REMOVING PARKING METER POST AND FOUNDATION

Description:

Under this item the Contractor shall completely remove all existing parking meter posts and the concrete foundations where shown on the plans, or as directed by the Engineer.

Materials:

Not specified.

Construction Details:

All parking meter posts and the concrete foundations shall be completely removed and replaced with a suitable backfill material as ordered by the Engineer. All posts removed under this item shall become the property of the Contractor and shall be removed by the Contractor from the site of the work. Before removing the existing parking meter posts and foundations, the Contractor shall contact the City of New York to have the parking meter heads removed. Parking meter heads are to be removed only by the City of New York.

Method of Measurement:

The quantity to be paid for under this item will be the number of parking meter posts and foundations completely removed.

Basis of Payment:

The unit price bid for removing parking meter posts and foundations shall include the cost of furnishing all labor, equipment, and materials necessary including excavation and backfill to complete the work. Sidewalk restoration will be paid for under the appropriate item.

### DESCRIPTION

This work shall consist of furnishing and installing safety switches in accordance with the plans, specifications, and proposal or as directed by the Engineer.

### MATERIALS

NEMA 1, 3R, 4 (Stainless Steel), 12: Challenger's Heavy Duty Series, Cutler-Hammer Inc.'s DH, General Electric Co.'s Type TH, Square D Co.'s Heavy Duty Series, Westinghouse Electric Corp.'s H-600 or approved equal having:

1. Fuses, or unfused as indicated on the plans.
2. Fused switches equipped with fuseholders (U.L. Class RK-1, RK-5, L)
3. NEMA 1 enclosure unless otherwise indicated on the plans.
4. Voltage ratings:
  - a. 240V rating for 120V, 208V, or 240V circuits
  - b. 600V rating for 277V or 480V circuits
5. Solid neutral bus when neutral conductor is included in the circuit.
6. Ground bus when equipment grounding conductor is included in the circuit.
7. Current rating and number of poles as indicated on the plans.

Nameplates. Precision engraved letters and numbers with uniform margins, character size (minimum 5 mm high).

1. Phenolic. Two colored laminated engravers stock, 2 mm minimum thickness, machine engraved to expose inner core color (white).
2. Aluminum. Standard aluminum alloy plate stock, minimum 1 mm 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.

### CONSTRUCTION DETAILS

Product Data: Catalog sheets, specifications and installation instructions.

Safety switches shall be installed as shown on the plans or as directed by the Engineer.

Identify each safety switch, indicating purpose or load served:

1. NEMA 1 Enclosures: Rivet or bolt nameplate to the cover.
2. NEMA 12 Enclosures: Rivet or bolt and gasket nameplate to the cover.
3. NEMA 3R, 4 Enclosures: Attach nameplate to the cover using adhesive specifically designed for the purpose. Do not penetrate enclosure with fasteners.

### METHOD OF MEASUREMENT

The quantity to be paid for will be the number of safety switches installed in accordance with the plans, specifications, and proposal or as directed by the Engineer.

### BASIS OF PAYMENT

The unit price bid for each safety switch shall include the cost of all labor, material and equipment necessary to complete the work.

**ITEM 11634.35M - TELEVISION INSPECTION AND VIDEO TAPE RECORDING OF SEWERS**

**Description:**

This work shall consist of furnishing all labor and materials necessary and required for television inspection and video tape recording of sewers in accordance with these specifications and in conformance with the contract plans or as directed by the Engineer.

**Materials:**

All materials and equipment used for television inspection and video tape recording shall be approved by the Engineer. Any material and equipment that is determined to be deficient or that becomes damaged to the extent that it no longer fulfills the requirements of this specification shall be repaired or replaced at the contractor's expense to the satisfaction of the Engineer.

**Construction Details:**

**A. General:**

The contractor shall perform the work promptly, diligently and complete the work without delay.

All work shall be performed in the sequence and at the exact locations as ordered by the Engineer. The contractor will be furnished the sequence of work locations by the Engineer.

The Engineer's Estimate is approximate only and no claim shall be made for loss of anticipated profits for items of work not performed. Furthermore, the contractor shall make no claim for, nor will he be paid additional compensation because of the sequence, separation or location of the work sites at which he will be required to work.

The electricity for all operations shall be provided by the contractor at his own expense.

An experienced supervisor who has a minimum of three (3) years experience in the field of pipeline inspection shall coordinate the entire inspection operation started under this section and as approved by the Engineer.

**B. Television Inspection and Video Tape Recording:**

The contractor shall conduct all the provisions of this section in a manner approved by the Engineer.

All labor, experienced supervision, technicians, mobile television studio, electronic equipment, television and Polaroid cameras, materials and equipment necessary and required to perform that is to be controlled from above the ground with a skilled technician at the control panel in a

**ITEM 11634.35M - TELEVISION INSPECTION AND VIDEO TAPE RECORDING OF SEWERS**

mobile television studio, controlling the movement of the television camera.

The technician with capability to adjust the brilliance of the built-in lighting system should be able to change the focus of the television camera by remote control. The television camera shall be positioned as near as possible to the spring line of the sewer.

The television camera shall be attached to a rod or cable that shall be metered to indicate the exact location of the camera at all times.

At the Engineer's discretion, the contractor shall provide a "Self-Propelled" camera to inspect sewers with limited access. This camera shall be compatible with the existing system.

The view seen by the television camera shall be transmitted to a monitor of not less than 14 inches in width. The monitor shall be located inside the mobile television studio.

The contractor's mobile television studio shall be large enough to accommodate up to four (4) persons comfortably seated for the purpose of viewing the monitor while inspection is in progress. The Engineer's representative shall be access to view the television screen at all times.

The Engineer or his duly designated representative will be so situated so that he will see all the video recording as it is taking place.

During the course of the inspection the engineer shall indicate the specific views appearing on the monitor which are to be photographed. The size of the Polaroid photographs shall not be less than 75mm x 100mm. The cost of the Polaroid photographs, ordered to be taken by the engineer, shall be deemed included in the contract price for television inspection and video tape recording. The Polaroid photographs shall be mounted within the report and keyed as their exact location on the route sheet.

The entire television inspection shall be recorded on V.H.S. cassette tape. The video tape recordings shall be keyed as to their exact location on the route sheet and shall be submitted to the Engineer with the report.

The recording shall be in black and white, however, the contractor shall have the option of recording in color at no additional cost to the City. The V.H.S. tape recorder shall be on with sound and video information can be recorded at the highest speed standardized by the electronics industry.

The contractor is hereby required to have his television inspection equipment set up in such a fashion that he will have two (2) V.C.R.'s recording and video cassettes simultaneously on the project site. Each V.C.R will be so designated and marked "V.C.R. A", 'V.C.R. B".

**ITEM 11634.35M - TELEVISION INSPECTION AND VIDEO TAPE RECORDING OF SEWERS**

Videocassette "A" produced in the field shall be given to the Engineer or his duly designated representative at the end of each shift or when the cassette is completed, whichever happens first.

Cassette "A" will have the following information on it: Contract No., Job No., Job Site, Date.

This cassette, when given to the Engineer or his duly designated representative, will be placed in a sealed envelope with the following information on the envelope.

Contract No.

Job No.

Job Site

Date Began

Date Completed

Printed name and signature of the Engineer with the date started and date completed.

Other pertinent information to maintain a chain of custody of the VHS tape.

This envelope will then be given to the Engineer or his duly designated representative so that it may be held in a secure location.

**C. Contract Drawings (Route Sheets):**

Two (2) sets of route sheets will be provided by the Engineer accurately locating all reference points, drainage structures, and or appurtenances located on the job site. Each shall be marked by the contractor in coordination with the data keyed on the video tape and shall become part of the contractor's report. The markings shall conform to current A.N.S.I. standards for microfilm quality.

**D. Contractor's Daily Reports:**

As soon as the contractor has started work on the contract, he shall submit to the Engineer written daily reports of the work performed the previous day by his employees or the subcontractor's employees.

The reports shall be prepared by the contractor's superintendent and shall bear his signature. Each report shall contain the following information:

1. The type of materials and/or major equipment being used by the contractor and the total number of employees working each category on that particular day.
2. Linear meters of sewers cleaned.

**ITEM 11634.35M - TELEVISION INSPECTION AND VIDEO TAPE RECORDING OF SEWERS**

3. Linear meters of sewers televised
4. Indicate number of trips to disposal site.

**E. Contractor's Report:**

After completion of the television inspection, the supervisor shall furnish to both the Engineer and the contractor a complete bound report for their permanent records. The report on the television inspection shall include but not be limited to logging each section of sewer, televised, giving specific details as to service connections, water infiltration from the joints, and other points of interest noted during the inspection.

The report and video tape recordings shall be delivered to the Engineer not more than ten (10) days after the completion of the television inspection and videotape recording. This report shall be signed by the experienced supervisor, contractor and the Engineer or his duly designated representative present at the time of the television inspection, such as structural deteriorations, leaks, cracks, blockages, cross and side connentions, etc.

The report shall be prepared by the contractor's superintendent and shall bear his signature. Three (3) copies of the report shall be furnished to the Department of Environmental Protection. The report shall include but not be limited to:

1. Route Sheet
2. Permanent Visual Record (photos keyed to route sheet)
3. Text and/or Summary

**Method of Measurement:**

The work shall be measured as the number of linear meters of sewer televised, and video tape recorded as specified under this section.

**Basis of Payment:**

The unit price bid per linear meter of sewer shall include the cost of all labor, materials and equipment necessary to complete the work.

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**ITEM 11634.8101 M - RELOCATE EXISTING GATE CONTROL BOOTH (3.3m x 3.6m)**

**DESCRIPTION :**

This work shall consist of relocating and making operational an existing prefabricated Gate Control Booth to a new location.

**MATERIALS :**

The existing Gate Control Booth is a prefabricated structure of the size, material and construction shown on the plans and details. Other material requirements are:

Hot Mix Asphalt	400-2
Cast in Place Concrete - Class A	501-2
Reinforcing Steel for Concrete Structures	556-2.01
Highway Lighting System	670-2

NYC Electrical Code and National Electric Code requirements.

Existing water and sewer services shall be extended and/or reconnected in accordance with the NYC Building Code, Reference Standard RS-16, Sections P100.0 thru P105.0 and Sections P107.00 thru 109.00, and NYCDEP Standards.

All electrical installations and necessary testing shall conform to EEI, NEMA, ANSI, ASTM Standards and the NYC Electrical Code. In addition, workmanship shall conform to the latest requirements of the National Electric Code, the rules of the New York State Public Service Commission, Con Edison requirements and any local ordinances which may apply.

**CONSTRUCTION DETAILS:**

The Contractor shall determine a method for relocating the existing Gate Booth to its new location and shall submit six copies of the Shop Drawings showing this relocation method to the Engineer for approval. These drawings shall depict all items necessary to complete the work including extending the existing services for the water, sewer, telephone and electric and connections to the existing and/or relocated semaphore gate. The plan shall also identify the type of equipment needed to move the booth, the duration of the move, and the location of the equipment during the move.

The existing utility services for telephone, communication and electrical services shall be extended and/or reconnected.

The Contractor shall unfasten, move and attach the booth in a manner such that the existing booth is not damaged in any way. The Contractor shall repair material damaged by their operations. The booth shall be installed level in its new location on a new concrete pad as detailed in the plans. The Contractor shall carefully make a straight saw cut for foundations. The method of attaching the booth to the new foundation shall be detailed in the shop drawings.

**ITEM 11634.8101 M - RELOCATE EXISTING GATE CONTROL BOOTH (3.3m x 3.6m)**

The pad shall have conduit stub-ups for any telephone and electrical connections. The conduit stub-ups shall extend through the concrete pad and connect to the roadside junction boxes indicated in the Contract Plans. The work shall include all necessary excavation and backfill for the connections. The Contractor shall furnish and install the conduit and cable for the electrical connections in the sizes indicated in the Contract Plans. The cable for the telephone connections shall also be furnished and installed under this item.

The Contractor shall extend and/or reconnect power connections from an existing light pole to the relocated booth.

Controls for the existing and/or relocated semaphore gate shall be reestablished.

The work shall include any ancillary operations not specified here or covered under other items but required to properly relocate the booth, including but not limited to reestablishing electrical and telephone service, providing power to the semaphore gate, obtaining power from existing light poles and roadway boxes, and removing and disposing or abandoning any duct and wires no longer needed.

The approval of the relocation is dependent on the Engineer's final inspection of the overall booth condition, including but not limited to the proper functioning of the electrical/telephone systems, the booth's stability, and its level installation. In addition the doors and window shall work in a manner similar to before the relocation, and the adjacent area shall be fully restored in a neat and skillful manner.

**METHOD OF MEASUREMENT:**

The work will be measured as the number of gate control booths relocated.

**BASIS OF PAYMENT :**

The unit price bid for Relocate Gate Control Booth shall include the cost of all labor, materials and equipment necessary to complete the work.

**ITEM 634.890010 M – HEALTH AND SAFETY**

**1. DESCRIPTION**

1.01 Health and Safety Requirements

A. Scope of Work

It is the Contractor's responsibility to stage and conduct his work in a safe manner. The Contractor shall implement a health and safety program for soil exposing work within the project limits. The Contractor's health and safety program shall apply to all construction personnel. In addition, the Contractor shall protect the public from on-site hazards, including subsurface contaminants associated with on-site activities.

Work shall include, but not be limited to:

1. Providing safety equipment and protective clothing for site personnel, including maintenance of equipment on a daily basis; replacement of disposable equipment as required; and providing all other health and safety measures. Safety equipment requirements are specified within this section.
2. Providing, installing, operating, and maintaining on-site emergency medical first aid equipment as specified in this section. This includes all furnishings, equipment, supplies and maintenance of all medical equipment, and all other health and safety items and services for which payment is not provided under other pay items in this Contract.
3. Providing, installing, operating, maintaining and decommissioning all equipment and other items and services required for the implementation of the Health and Safety requirements for which pay items are not provided elsewhere in this Contract.
4. Provide the minimum health and safety requirements for soil disturbing activities during the Reconstruction of Route 9A – West Street (Battery Place to Chambers Street).
5. Implement and enforce the Route 9A Health and Safety Plan (HASP). The HASP as presented in these specifications is dynamic with provisions for change to reflect new information, new practices or procedures, changing site environmental conditions or other situations which may affect site workers and the public.
6. The HASP addresses measures for community protection, accident prevention, personnel protection, emergency response/contingency planning, and air monitoring.
7. Provide a confined space entry program.

B. Applicable Regulation/Publications

The Contractor shall comply, at a minimum, with the following:

1. Occupational Safety and Health Administration (OSHA), Standards and Regulations, 29 CFR 1910 and 1926.
2. U.S. Department of Health and Human Services (DHHS) "NIOSH Sampling and Analytical Methods," DHHS (NIOSH) Publication 84-100.
3. ANSI, Practice for Respiratory Protection, Z88.2 (1980).
4. ANSI, Emergency Eyewash and Shower Equipment, Z41.1 (1983).
5. ANSI, Protective Footwear, Z358.1 (1981).
6. ANSI, Physical Qualifications for Respirator Use, Z88.6 (1984).

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7. ANSI, Practice for Occupational and Educational Eye and Face Protection, Z87.1 (1968).

C. Submittals

1. The Contractor shall submit, within forty-five calendar days after the Contract award, the Implementation Plan (IP) for the HASP as specified in Section 3.01B, to the Engineer for his review. The Contractor shall make all necessary revisions required by the Engineer and resubmit the IP to the Engineer for his acceptance. Start-up work will not be permitted until written acceptance has been received from the Engineer.
2. Daily safety logs shall be maintained by the Contractor and shall be submitted to the Engineer either on request or on completion of the work. The logs shall include items specified in Section 3.01 L, Record Keeping and Reporting.
3. Training logs shall be maintained by the Contractor and submitted to the Engineer either on request or on completion of the work.
4. Daily logs on air monitoring associated with soil disturbing activities shall be prepared and maintained by the Contractor and submitted to the Engineer either on request or upon completion of the work.
5. A Closeout Safety Report shall be submitted by the Contractor to the Engineer upon completion of all work. This report shall summarize the daily safety and monitoring logs and provide an overview of the Contractor's performance with regard to IP requirements.
6. Accident Reports. All accidents, spills, or other health and safety incidents shall be reported to the Engineer.

1.02 Dust Control

The Contractor shall conduct operations and maintain the project site so as to minimize the creation and dispersion of dust. Dust control measures shall be used throughout the period of subsurface construction, especially during soil disturbing activities, pile placement, handling and transport of soils, and backfill operations. The proposed measures are detailed in Section 3.02.

1.03 Spill Control

A. Scope of Work

1. The Contractor shall implement, maintain, and be responsible for a comprehensive Spill and Discharge Control Plan. This shall provide contingency measures for potential spills and discharges from handling of contaminated soil and water, tank and drum residuals, and off-site transportation.
2. The Contractor shall provide methods, means, and facilities required to prevent contamination of soil, water, uncontaminated structures, equipment, or material by the discharge of wastes from spills due to Contractor's or Subcontractor's operations.
3. The Contractor shall provide equipment and personnel to perform emergency measures required to contain all spillage and to remove spilled materials as well as any soils or liquids that become contaminated due to the spillage. This collected spill material will be properly disposed of at the Contractor's expense.

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- 4. The Contractor shall provide equipment and personnel to perform decontamination measures that may be required to remove spillage from previously uncontaminated structures, equipment, material, or existing ground.

1.04 Mobilization/Demobilization

A. Summary

- 1. This section covers the requirements for proper site mobilization prior to the start of construction activities and demobilization at completion of all work required under this Health and Safety specification
- 2. The work shall consist of the mobilization and demobilization of the Contractor's or Subcontractor's personnel and equipment necessary for performing the intended work of this Health and Safety specification.  
It shall not include mobilization for any specific item or work for which payment is provided elsewhere in the Contract.

B. Mobilization and Site Preparation

Work shall include but not be limited to:

- 1. All work required to furnish, install and maintain all sign, equipment storage and office trailer facilities, parking areas, and all temporary utilities as required in this Health and Safety specification.
- 2. All work required for completion preparation of staging area for roll-off containers and any required fencing.
- 3. All direct invoiced costs from bonding companies and government agencies for permits and costs of insurance.

C. Demobilization

Work shall include but not be limited to:

All work required to remove from the site all equipment, temporary utilities and supporting facilities, performance of necessary decontamination and repairs, and any other items and services required for which pay items are not provided elsewhere in this Contract.

2. **MATERIALS**

2.01 Health and Safety Requirements

The Contractor shall provide and maintain, at a minimum, all of the equipment and materials specified in Section 3.01, Subsections F,G, and H and Sections 2.03 and 2.04.

2.02 Dust Control

A. Materials

- 1. The Contractor shall provide potable water, free from salt, oil, and other deleterious material to be used for dust control in all excavations.

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2. If a dust suppressant foam is utilized, it shall be any of those recommended in Table 4-2 of EPA/625/6-85/006, Remedial Action at Waste Disposal Sites.

**B. Equipment**

The Contractor shall supply spraying equipment capable of accessing all contaminated work areas. Foam spraying equipment shall be used in conjunction with the water spraying equipment so as to allow foam application 1% to 6% concentrations by volume.

**2.03 Spill Control****Equipment Requirements**

The Contractor shall provide for the appropriate response to any unexpected spill or discharges through provision of the following minimum equipment to be kept on site at all times during site work activities:

- o Sand, (two cubic meters minimum) clean fill, or other noncombustible absorbent. Recommended absorbents include HAZORB spill pillow (stock a minimum of five cases) and Solid-A-Sorb or similar granular diatomaceous earth (stock 10 each 11kg bags).
- o Drums (ten 208 liter, U.S. DOT 17-E or 17-H)
- o Shovels

**2.04 Mobilization/Demobilization**

Materials required shall include temporary fencing, temporary barriers, and all necessary facilities and equipment.

- A. Temporary fencing and gates: Fences and gates shall be grounded. The fence or barrier must be positioned so that they are compatible with the maintenance and protection of traffic requirements of this contract.

**3. CONSTRUCTION DETAILS****3.01 Health and Safety Requirements****A. Staff Organization, Qualifications, and Responsibilities****1. Health and Safety Officer (HSO)**

The Contractor's Health and Safety Officer (HSO) shall be responsible for preparation, implementation, regular on-site supervision and on-going evaluation of the effectiveness of the Implementation Plan (IP)

The preparation and implementation of the IP shall include air monitoring (organic vapors, combustible gases, and dust) for soil disturbing activities. The HSO shall perform any necessary sampling of soils and ground water for chemical testing. The HSO shall also conduct site specific orientation for all personnel, visitors and Federal and State Regulatory representatives who will either enter the work area during soil disturbing activities. This orientation is to explain the potential hazards to health and safety. For workers aware of the potential hazards; provides the skills to perform the work with minimal risks; make workers aware of the use and limitations of safety equipment and that workers can safely await or escape from emergencies.

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The HSO shall have a minimum two years experience in implementation of air monitoring and sampling programs. The HSO must have a four year college degree in occupational safety and health or a science/engineering degree.

The HSO must have completed a 40-hour training course and an 8-hour supervisor's course that meets OSHA requirements of 29 CFR 1910.

The HSO shall be assigned to the work site on a full-time basis for the duration of soil disturbing activities with functional responsibility for implementation of the Health and Safety Plan and the air monitoring program. The HSO shall certify that personnel trained by him/her are proficient in the use of this equipment by completing and signing training logs which shall identify the monitoring instruments to be used, outline the topics addressed in the training, date of training, and driver's license number(s) of the attendees.

If the HSO must be absent from the field, he/she will designate a qualified replacement who is familiar with the health and safety plan and has completed a 40-hour training course and an 8-hour supervisor's course that meets OSHA requirements of 29 CFR 1910.

**B. General Requirements**

1. This paragraph provides the basic general requirements for preparation of the IP.  
The Contractor, via the HSO, shall be responsible for the development and implementation of the IP in accordance with the requirements of Section 1.01B Applicable Regulations/Publications.
2. Determination of the appropriate level of worker safety equipment and procedures shall be made by the Contractor's HSO based on an initial project area survey and the results of the previous investigations.  
As work progresses, the HSO shall specify personnel protection levels based on site activity and monitored contaminant levels.
3. Should the Contractor seek modification of the base specification or any portion or provision, such modification shall be requested in writing to the Engineer. The Engineer shall provide a response in writing to the Contractor within five working days from the date of submittal. All on-site personnel shall be fully informed of the modifications and required actions.
4. Specifications and requirements delineated in this section are in addition to, or are an amplification of, all applicable State and Federal regulations pertaining to this type of work. Any revision or addition to these regulations must be reviewed by the Contractor for the applicability to the IP. In such case, the Contractor shall revise or add the new requirements to the IP and resubmit it to the Engineer for review and approval.
5. Failure to comply with the provisions in the Health and Safety Specification shall be deemed just and sufficient cause for ordering cessation of all construction work until the matter has been rectified to the satisfaction of the Engineer.
6. The IP shall include, but not be limited to, the following requirements:

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- a. General IP introduction including project location, scope of work covered by IP, names, addresses, and telephone numbers for the Contractor's project manager, the HSO, and emergency assistance telephone numbers;
- b. Sign-off sheet indicating acceptance by Contractor's project manager, the HSO, and the NYSDOT;
- c. Position description of Health and Safety personnel;
- d. Project descriptions;
- e. Contaminant description/characterization;
- f. Hazard assessment for community and construction workers;
- g. Training requirements;
- h. Construction personnel protection including level of protective clothing and gear, and safety equipment;
- i. Monitoring procedures and threshold limits for soil disturbing activities for community protection and for construction worker protection;
- j. Safety considerations for activities related to contaminated materials;
- k. Emergency plan; and
- l. Chemical data sheets for contaminants of concern.

**7. Summary of Available Information**

The NYSDOT has completed an assessment of subsurface contamination within the project limits. Copies of this information, including chemical test results, the Field Sampling Plan, and a Health and Safety Plan, are available for inspection at the Route 9A Project Office, 21 South End Avenue, Manhattan.

The reports and data summaries of on-site conditions within the project limits are not a part of the Contract, however they are available for inspection by the Contractor. The NYSDOT assumes no responsibility whatsoever with respect to the sufficiency or accuracy of the information, the records thereof, or of the interpretations set forth therein or made by the NYSDOT.

**C. Levels of Protection**

1. The Contractor shall include in the IP a list of tasks and specific levels of protection for each task to be performed. The minimum levels of protection must conform to the minimum requirements detailed under 29 CFR 1910. Levels of protection may be upgraded or downgraded during site activities, based upon air monitoring results, meteorological conditions and the judgment of the HSO, after consulting with the Engineer.
2. Initial Level of Protection: Based on results of prior soil and soil gas sampling, personnel shall initially wear Level D protective clothing. Respiratory protection may be upgraded to Level C if the monitoring equipment indicated increased contaminant levels. Decision to upgrade or downgrade levels of protection shall be the responsibility of the HSO.
3. Provided below are levels of protection for anticipated project area activities. Where more than one level is indicated, further definition shall be provided by the Contractor's HSO through review of project area hazards, prevailing project area conditions, proposed operational requirements, and monitoring.

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<u>Task</u>	<u>Respiratory Protection</u>	<u>Protective Clothing</u>
Excavation	C/D	C/D
Other Soil Disturbing Activities	C/D	C/D
Pilings/Caisson Emplacement	C/D	C/D

**D. Safe Work Practices and Engineering Safeguards:**

The IP shall address the safe work practices and engineering safeguards to be employed for the work covered under this Specification. These shall include but not be limited to the following:

1. Definitions of personal protective clothing shall be specified. Respiratory protection shall also be addressed in the IP.
2. Real time threshold limits for air quality monitoring, determination of the level of protection required, and an emergency plan.
3. Heat Stress. The Contractor shall include protocols and requirements for heat stress monitoring and protective measures in the IP. Procedures for monitoring, minimizing and/or avoiding heat stress shall be followed in accordance with the guidance of the American Conference of Governmental Industrial Hygienists (AG/CGIH) in its TLV booklet 1988-89. Such monitoring shall be performed by the HSO.

**E. Training:**

1. The Contractor shall certify that all Contractor and subcontractor personnel performing or supervising soil disturbing work have received project specific health and safety training provided by the Contractor through the Health and Safety Officer. Proof of project specific training shall be documented and provided to the Engineer prior to the start of actual construction.
2. The Contractor's HSO shall be responsible for site specific training for all personnel, visitors, and representatives from Federal and State Regulatory Agencies. In addition, they all shall be informed of the potential hazards associated with the site, emergency procedures and use of protective gear, as required, during the visit.
3. The Contractor shall submit his training curriculum along with the name/qualification of the instructor utilized with his IP.

**F. Personal Safety Equipment and Protective Clothing:**

The Contractor shall provide all personnel with appropriate personal safety equipment and protective clothing. The Contractor shall also provide appropriate personal safety equipment and protective clothing for all visitors. The Contractor shall ensure that all safety equipment and all protective clothing is used properly, is free of contaminants and is disposed of properly.

**G. Emergency Equipment and First Aid Requirements:**

1. The work area shall be provided with an approved emergency eye wash and drench system in accordance with ANSI Standard Z358.1, and A20-80 B:C type dry chemical fire extinguisher. These units shall be portable and located near the work area at an easily accessible location. Water shall be potable and temperature controlled.
2. At least one "industrial" first aid kit and a stretcher shall be provided and maintained, fully stocked and at an easily accessible, manned location.

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3. The Contractor shall have at least one person certified in First Aid and CPR in the project area at all times. This person may perform other duties, but must be immediately available to tender first aid or CPR when needed. Certification shall be by the American Red Cross or other approved agency.
4. Dry chemical fire extinguishers shall be provided at the Contractor's office, the Engineer's office and at other project area locations where flammable or combustible material may present a fire risk.

**H. Emergency Response and Contingency Planning:**

1. In addition to the regulations to be posted as specified in general requirements, the Contractor shall develop and submit with the IP an Emergency Response and Contingency Plan. The Emergency Response and Contingency Plan shall meet the requirements of 29 CFR 1910.120 (1). Following approval, this plan shall be posted at the Field office. This plan shall include, but not be limited to:
  - a. Name, address and telephone number of an available doctor.
  - b. Procedures for prompt notification of local health facilities and fire department for emergency assistance.
  - c. Emergency procedures for handling personnel with skin or expiratory exposure to chemical or contaminated soil.
  - d. Emergency contingency procedures for fires, explosions, evacuation or on-site personnel or unplanned hazardous incidents.
  - e. Emergency procedures for treatment of personnel with injuries or stress related illnesses.
  - f. Procedure for notifying the NYSDOT Engineer, and responsible agencies in case of accident or emergency.
  - g. Emergency response plan should include phone number listed on Figure 1.21-4 in addition to the following:
 

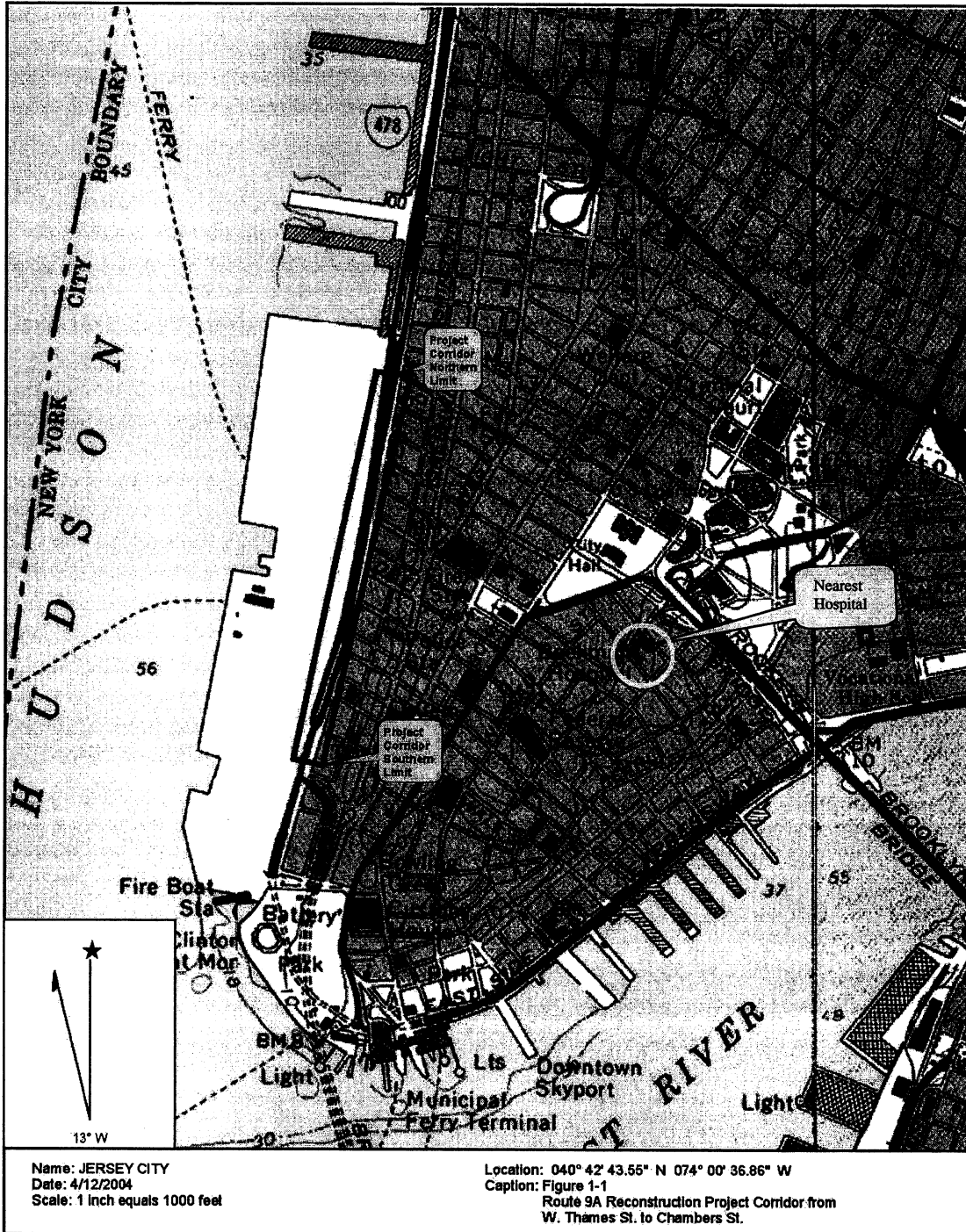
• Police Department	911
• Fire Department	911
• Rescue Service	911
• New York (or Beekman) Downtown Hospital – 170 Williams St. (See Fig. 1)	(212) 312-5000
• EPA National Response Center	800-424-8802
• Poison Control Center	800-962-1253
• NYSDEC Hotline	800-457-7362

The Contractor shall prominently display in the Contractor's site field office and Engineer's office all phone numbers above and any additional numbers that are deemed necessary for emergency contacts.

2. The Contractor shall arrange for emergency medical care services at a nearby medical facility and establish emergency travel routes prior to starting work on-site. The Contractor shall establish procedures and facilities for emergency communication with health and emergency services.

**ITEM 634.890010 M – HEALTH AND SAFETY**

Figure 1 – Site Location and Nearest Hospital



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3. Site support vehicles designated for use in transportation of injured or ill personnel shall be provided with a route map to the medical facility(ies). All on-site employees shall be thoroughly familiar with the emergency routes to the medical facility(ies).
  4. In the event of an emergency, the Contractor shall, without delay, take action to safeguard employees, remove, or otherwise mitigate the cause of the emergency, alert the Engineer to whatever measures may be necessary to prevent repetition of the conditions or actions leading to, or resulting in, the emergency. If the emergency condition poses either a potential or actual threat to the community, appropriate emergency officials shall be immediately contacted, including the New York City Police Department, the New York City Fire Department, the New York State Department of Environmental Conservation, the New York State Department of Health, and the New York City Department of Health.
- I. Posted Regulations:
- The Contractor shall develop posted regulations which shall be reviewed and approved by the Engineer before start of the construction. These regulations shall address on-site protocol regarding use of personal protective equipment, personal hygiene, smoking, and eating.
1. These protocols shall be posted in the Contractor's site field office and Engineer's office and within the general work area. They shall be reviewed regularly with the Contractor's personnel.
- J. Communications:
1. The Contractor shall provide hard line telephone communications at his site field office and the Engineer's site office.
  2. Emergency numbers, listed in Paragraph H.1.g, of this section shall be prominently posted near all on-site telephones.  
Security personnel at the site shall immediately refer problems reported during non-work hours to the appropriate agencies and individuals.
  3. The Contractor shall provide two-way radio communication between the field office and each work zone during work activity, the HSO, to the Engineer and staff, and the Contractor's supervisory personnel.
- K. Air Monitoring:
1. General Requirements:
    - a. The Contractor's HSO shall conduct air monitoring to detect and quantify volatilization of soil contaminants and/or release of soil particles associated with soil disturbing activities at the project site. This program shall be submitted as part of IP for review and approval by the Engineer.
    - b. Data gathered during air monitoring shall be used by the HSO to determine whether or not appropriate safety and personnel protective measures are being implemented or if they should be defined further to document on-site employee exposure and access off-site migration of contaminants released

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- during the soil disturbing activities in order that appropriate control measure and/or contingency plans may be taken.
- c. Information gathered during the monitoring shall be documented and included as part of the project records and Health and Safety Log.
2. General Responsibilities:
- a. The Contractor's HSO shall be responsible for implementing air monitoring strategies and protocols. These strategies and protocols address appropriate air monitoring techniques for volatile organic compounds and particulates in the general work area.
  - b. The Contractor shall be responsible for establishing and documenting baseline air quality and for conducting air monitoring during on-site activities. Baseline air quality monitoring shall be conducted for 8 hours on a weekday prior to commencing soil disturbing activities. The methodology shall be as set out in Subsections 3.01 L.3 and 3.01 L.4 with monitoring at the upwind and downwind perimeters of the proposed work area and at the closest downwind location where residents or passersby will come to the proposed work area.
  - c. All air monitoring and meteorological equipment required shall be provided by the Contractor and shall be maintained and calibrated by the Contractor according to NIOSH analytical methods and the manufacturer's recommendations. Such maintenance and calibration data shall be recorded and included in all project record documents.
  - d. All air monitoring equipment shall be operated only by personnel trained specifically in their use.
  - e. The Contractor shall utilize the action levels designated in Tables 1 and 2. These action levels shall determine the level of respiratory protection required, the adequacy of air monitoring, stop work, and/or emergency/contingency action.
  - f. The Contractor's HSO shall be responsible for the sampling and analysis of all samples collected during the program, for the interpretation of the analytical results, and for the recording, presentation, and documentation of all results.
  - g. The Contractor shall maintain a 24 hour, 7 day a week hot line telephone number so that community residents can report unusual occurrences to the Contractor. The telephone number shall be prominently posted on a fence or billboard at the edge of the work area. The signs shall be spaced at no more than 60 meters apart. The Contractor shall keep a log of all telephone calls and shall promptly respond to and correct any occurrences.
  - h. The work/equipment yard shall be on NYSDOT property within the general work area and shall be enclosed by a fence. The Contractor shall employ security personnel to prevent entry into any of these areas during non-working hours.
3. • Work Area Monitoring
- a. The Contractor shall furnish and maintain real time air monitoring equipment. The equipment shall be comprised of an organic vapor meter (OVM), a

**ITEM 634.890010 M – HEALTH AND SAFETY**

Combustible Gas Indicator (CGI) and a Particulate Monitor (PM<sub>10</sub>). The instruments shall be used to record the one minute average for one minute every sixty minutes during all soil disturbing activities. These measurements shall be made as close to the excavation as practical and at the breathing height of the workers. The measurements shall begin before the start of soil disturbing work and shall continue until after the excavation is closed either temporarily or permanently. The HSO shall setup the equipment at the start of work and confirm that it is working properly. During the work day, a qualified assistant may oversee the air measurements.

The OVM shall have a useful range of 0.1 to 1,000 parts per million (ppm), and a sensitivity of 0.1 ppm. The GCI shall have a useful range of 0 to 100 percent of the Lower Explosive Limit (LEL), and a sensitivity of 1 percent of LEL. The PM<sub>10</sub> monitor shall be capable of sampling between 5 and 1,000 cubic centimeters per minute. All instruments shall be intended for field use, and if rechargeable battery powered, the battery shall have an operating battery life of 12 hours. Specifications of all equipment shall be supplied to the Engineer, and the equipment must be approved by the Engineer prior to being used on the project. The Contractor shall maintain and calibrate the equipment as specified by the manufacturer, including frequency of both field and factory calibration. The Contractor shall have at the project site replacement parts and tools to repair the equipment as allowed by the manufacturer. The Contractor shall supply and maintain sufficient numbers of each piece of equipment to satisfy the monitoring stations specified below as well as having one spare for each type of monitoring equipment.

- b. The Contractor shall take the actions specified in Table 1, RESPONSE ACTION SUMMARY WORK AREA immediately when the action levels are reached or appear about to be reached. Action levels are defined as the one minute average of the measurements. When any levels are defined as the one minute average of the measurements. When any of these actions are taken, the HSO shall notify the Engineer. Work shall not resume until:
  1. Appropriate corrective measures are implemented or the monitoring equipment indicates that the concentrations have fallen below the action levels; and
  2. Authorization to resume work is given by the Engineer after consultation with the HSO.
- c. Significant increases of monitored levels above background shall be reported by the HSO to the Engineer. The HSO shall determine if monitored levels require that site operations shall be discontinued and contingency plans activated.

If the real-time air monitoring indicates sharp and increasing levels and the HSO determines an imminent health hazard exists, work at the location shall be halted immediately and personnel evacuated to a predetermined upwind location.

The Engineer shall be notified immediately and work will not resume until:

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Appropriate corrective measures are implemented or monitoring instruments indicate decreasing levels of contamination; and Authorization to continue work is given by the Engineer after consultation with the HSO.

Table 1

**RESPONSE ACTION SUMMARY****WORK AREA**

Instrument	Action Level	Response Action
OVM	Less than 5 ppm above background.	Continue work, level D.
	Between 5 and 25 ppm above background.	Notify Engineer, level C.
	More than 25 ppm above background.	Stop work. Notify emergency services. Vent area. Resume work when less than 25 ppm above background.
CGI	Less than 10 percent of LEL.	Continue work, level D.
	Between 10 and 20 percent of LEL.	Notify Engineer, level C.
	More than 20 percent of LEL.	Stop work. Notify emergency services. Vent area. Resume work when less than 20 percent of LEL.
Particulate Monitor	Total particulates less than 5 mg/m <sup>3</sup> and Respirable particulates less than 1 mg/m <sup>3</sup> .	Continue work, level D.
	Total particulates between 5 and 15 mg/m <sup>3</sup> or Respirable particulates between 1 and 5 mg/m <sup>3</sup> .	Apply dust suppression measures. Notify Engineer.
	Total particulates above 15 mg/m <sup>3</sup> or Respirable particulates above 5 mg/m <sup>3</sup> (1).	Stop work. Apply additional dust suppression measures. Resume work when total particulates less than 15 mg/m <sup>3</sup> and respirable particulates less than 5 mg/m <sup>3</sup> .
(1) = 29 CFR Part 1910.1000 Occupational Safety and Health Standards for Air Contaminants.		
LEL = Lower Explosive Limit		

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- d. A data sheet shall be developed and implemented by the HSO upon which the Contractor shall record the following real-time monitoring data and information:
1. Date and time of monitoring;
  2. Air monitoring location;
  3. Instruments, model #, serial #;
  4. Calibration/background levels;
  5. Results of monitoring;
  6. Signature of the HSO;
  7. Interpretation of the data and any further recommendations by the HSO. These results shall be given verbally to the Engineer following each site scan and documented in writing by the end of each work day. Copies of the data sheets shall be included in the daily safety log.
  8. The data logger tapes and a readout of the recorded data shall be given to the Engineer at the end of each day.
4. Community Air Monitoring:
- a. In addition to the work area air monitoring required by Section K.3., community air monitoring shall be done whenever soils are disturbed. The purpose of Community Air Monitoring is to safeguard nearby residents and passersby from volatile organic compounds and dust and particulate matter that could be contaminated.
  - b. The Contractor shall furnish and maintain real-time air monitoring equipment whenever soils are disturbed. The equipment shall be comprised of an organic vapor meter (OVM) and a Particulate Monitor (PM<sub>10</sub>). The monitors shall be equipped with a continuous recording data logger. The data logger shall record the one minute average. Measurements will begin ½ hour before the start of soil disturbing activities and continue until at least ½ hour after the end of soil disturbing activities. The Contractor shall have on-site a data logger reader so that the continuous monitoring records can be read by the Engineer. Specifications of the equipment shall be supplied to the Engineer, and the equipment must be approved by the Engineer prior to being used on the project. The Contractor shall maintain and calibrate the equipment as specified by the manufacture, including frequency of both field and factory calibration. The Contractor shall have at the project site replacement parts and tools to repair the equipment as allowed by the manufacturer. The Contractor shall supply and maintain sufficient equipment to satisfy the monitoring specified below as well as having one spare on hand.
  - c. During all soil disturbing activities, measurements shall be taken for one minute every six minutes with the monitors at two locations along the perimeter of the active work area. One monitor location shall be on the upwind side of the work, at the point where residents and/or passersby can come closest to the excavation. The HSO shall setup the equipment at the start of work and confirm that it is working properly. During the work day, a qualified assistant may oversee the air measurements.
  - d. The Contractor shall take the actions specified on Table 2, RESPONSE ACTION SUMMARY PERIMETER COMMUNITY AIR MONITORING immediately when the action levels are reached or appear about to be reached. Action levels are defined

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as the one minute average of the measurements. When any of these actions are taken, the HSO shall notify the Engineer. Work shall not resume until:

1. Appropriate corrective measures are implemented or the monitoring equipment indicates that the concentrations have fallen below the action levels; and
  2. Authorization to resume work is given by the Engineer after consultation with the HSO.
- e. Levels measured by the PM<sub>10</sub> monitor or OVM above the actions shown in Table 2, RESPONSE ACTION SUMMARY PERIMETER COMMUNITY AIR MONITORING, shall be reported by the HSO to the Engineer and site operations shall be discontinued and contingency plans activated.
- f. A data sheet shall be developed and implemented by the HSO upon which the Contractor shall record the following real-time monitoring data and information:
1. Date and time of monitoring;
  2. Air monitoring locations;
  3. Instruments model and serial numbers;
  4. Calibration/background levels;
  5. Results of monitoring;
  6. Signature of the HSO; and
  7. Interpretation of the data and any further recommendations by the HSO. These results shall be given verbally to the Engineer following each site scan and documented in writing by the end of each work day. Copies of the data sheets shall be included in the daily safety log.
  8. The data logger tapes and a readout of the recorded data shall be given to the Engineer at the end of each day.

L. Record Keeping and Reporting:

1. The Contractor shall maintain logs covering the implementation of the Health and Safety Plan. The format shall be developed by the Contractor and shall include Training Logs, Daily Health and Safety Logs, Air Monitoring Logs, and a Closeout Safety Report. These logs shall be submitted to the Engineer as specified.
2. Training logs shall be completed by the HSO and submitted to the Engineer either on request or on completion of the work. These logs shall include:
  - a. Employee's name, Driver's License number and attendance record;
  - b. Time allocated in the training session;
  - c. Topics covered;
  - d. Materials used;
  - e. Equipment demonstrated;
  - f. Equipment practice for each employee;
  - g. Prohibitions covered;
  - h. Explanation of the buddy system;
  - i. Signature of trainer;
  - j. Other pertinent information.

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## PERIMETER COMMUNITY AIR MONITORING

## WORK AREA

Instrument	Action Level	Response Action
OVM	Less than 5 ppm above background at perimeter	Continue work, level D.
	Between 5 and 25 ppm above background at perimeter.	Stop work. Notify Engineer. Resume work if level of less than 5 ppm above background at either 60 meters downwind from perimeter or half the distance to the nearest structure, whichever is closer.
	More than 25 ppm above background at perimeter.	Stop work. Notify emergency services. Vent area. Additional monitoring within 5 meters of the nearest residential or commercial structure. Resume work when source of vapors is abated.
Particulate Monitor	Less than 75 $\mu\text{g}/\text{m}^3$ above background.	Continue work, level D.
	Between 75 and 150 $\mu\text{g}/\text{m}^3$ above background.	Apply dust suppression measures. Notify Engineer.
	More than 150 $\mu\text{g}/\text{m}^3$ above background (1).	Stop work. Apply additional dust suppression measures. Resume work when less than 150 $\mu\text{g}/\text{m}^3$ above background.
(1) = 40 CFR Part 50.6, National Primary and Secondary Ambient Air Quality Standards for Particulate Matter.		

3. A Health and Safety Log shall be completed daily by the HSO and submitted to the Engineer either on request or upon completion of the work. These logs shall include:
  - a. Date;
  - b. Work area(s) checked;
  - c. Employees present in work area(s);
  - d. Equipment being utilized by employees;
  - e. Protective clothing being worn by employees;
  - f. Protective devices being used by employees;
  - g. Accidents or breaches of procedure.
4. Air Monitoring Logs shall be completed by the HSO and submitted to the Engineer either on request or upon completion of the work. These logs shall include:

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- a. Date of Report;
  - b. Equipment utilized for air monitoring;
  - c. Air monitoring results from each work location/time(s);
  - d. Time-Weighted –Average results from perimeter monitoring stations and date of sampling;
  - e. Calibration methods of equipment/results.
  - f. The data logger tapes and a readout of the recorded data shall be given to the Engineer at the end of each day.
5. Close-Out Safety Report:
- At the completion of the work, the Contractor shall submit a close-out safety report. The report shall be signed and dated by the HSO and submitted to the Engineer.
- Final acceptance of the work will not be given before the close-out safety report has been received and approved by the Engineer.
- M. Gas Monitoring:
1. The Contractor's attention is directed to the fact that the existing combined sewers, tidegate chambers and Con Edison utility tunnels are potentially hazardous and may be toxic, contain insufficient oxygen for human survival or contain gases combustible in the presence of oxygen.
  2. When working within a confined space, the Contractor shall take suitable precautions to insure safe working conditions. Before entering any confined space, the Contractor shall insure that all hazardous gases have been evacuated and that the working atmosphere complies with applicable OSHA confined-space regulations.
  3. All demolition work performed in confined spaces shall meet the applicable requirements of the following:
    - a. Water Pollution Control Federation "Manual of Practice No. 1, Safety in Wastewater Works."
    - b. NFPA No. 327 "Standard Procedures for Cleaning and Safeguarding Small Tanks and Containers."
    - c. The Occupational Safety and Health Act of 1970, OSHA.
  4. When working in confined space, the Contractor shall use spark-proof tools, explosion-proof temporary lighting, and shall not use electric power tools, open flame devices, electric welding, or any device or methods which might conceivably cause ignition or an explosion, unless specifically permitted by the Engineer. If the Contractor anticipates that the use of spark producing equipment and methods may be necessary, specific approval by the Engineer for such use will be granted only under the following conditions and under such other special conditions that the Engineer may find prudent to impose in order to cover unforeseen circumstances.
  5. Before the Contractor uses such spark producing equipment or methods, he shall give the Engineer reasonable advance notice, stating the location and nature of the work proposed, the type of spark producing equipment or methods to be used, and the hours during which his work will take place. The Contractor will then arrange to have a check made to determine if the location where said equipment or methods are used is gas free. If location proves to be unsafe, the Contractor shall furnish, install, and operate and later remove such facilities as are necessary to provide a safe area.

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6. The Contractor will then recheck the area and, if safe, receive authorization from the Engineer to work in the area. The Contractor will arrange for a continuous check of the area during the working period. Only work which complies with the authorization shall be performed during the agreed hours and during the continuous area check.
7. All checks and monitoring shall be documented on the daily log report discussed in 8.f below.
8. Confined Space Monitoring:
  - a. When the Contractor is working in confined space, he shall arrange for or provide his own gas detection service as specified below.
  - b. Thirty (30) days prior to starting any work in confined space, the Contractor shall provide a detailed schedule of the work to be performed in the confined space, including estimated dates and durations. The Contractor shall update his schedule weekly until the work is complete.
  - c. The Contractor shall notify the Engineer in writing 48 hours in advance of performing work in confined spaces.
  - d. The Contractor shall not proceed with any work in confined spaces without a gas detection service at the site at least one hour before the start of the work.
  - e. Qualifications of Gas Detection Employees:

The Contractor's employees (or Subcontractor) responsible for gas detection shall have a previous history of at least three (3) years satisfactory experience in the monitoring of toxic and flammable gases. The Contractor shall provide continuous services with staff commensurate with the requirements of the activity until the completion of the Contract. Specifically, the Contractor shall furnish the following

    1. A project Manager who is certified by the American Board of Industrial Hygiene. The Project Manager shall have a minimum of three (3) years experience in the gas monitoring field, which shall include at least one year of project manager experience where methane, hydrogen sulfide, and/or oxygen deficiency were measure on a daily basis.
    2. An alternate, with similar qualifications and/or experience as the Project Manager, should be on staff in the event that the Project Manager is unavailable.
    3. Technicians who shall be capable of using self-contained breathing apparatus and in performing confined space entry based on experience and/or comparable training. Technicians shall have a minimum of six months experience in monitoring toxic and flammable gases.

The Contractor must comply with the provisions of the Labor Law and all State, Federal, and Local statutes, ordinances and regulations that are applicable to the performance or the work under this section; and will secure all licenses and permits, if any, that are necessary for the performance of his duties. The Engineer shall have the right to interview and review the qualifications of all personnel employed or retained for under these specifications.

The Contractor's employees responsible for gas detection shall provide the following services:

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- 1) Site reconnaissance to become familiar with the confined space and surroundings and review of general potentially dangerous conditions in the work areas.
- 2) Gas detection survey to determine the concentrations of: (a) oxygen (in percent); (b) hydrogen sulfide (in parts per million); and (c) combustible gases particularly methane (in percent (Lower Explosive Limit) LEL), at all areas.
- 3) Periodic review of work; and review and acceptance of the equipment and tools used in confined space.
- 4) Provide written verification of the calibration and proper operation of the gas detection equipment before the Contractor's start of work.
- 5) Provide written verification of safe conditions in operating area every work day upon completion of instrument calibration and before the Contractor's start of work.
- 6) Continuous monitoring of the area with logging of highest one minute reading every 4 hours.
- 7) Notify the Contractor whether all areas have been found safe to work.
- 8) If, at any time during the day, methane is detected at a concentration of 10% LEL and/or hydrogen sulfide at a concentration of 10 parts per million (ppm), a WARNING condition shall be declared, and the Contractor and the Engineer shall be immediately appraised of the condition.
- 9) If, at any time during the day, the Contractor detects the presence of methane, or any other combustible gas at a concentration equal to or greater than 20% of the LEL and/or identifies an oxygen concentration of 19.5% or less, and/or detects hydrogen sulfide at 20 ppm or greater, a HAZARDOUS condition shall be declared and the Contractor shall take the following actions: (1) warn all personnel that an unsafe condition exists; (2) notify the Engineer that a Hazardous Condition has been declared; (3) notify all personnel in the potentially effected area to immediately evacuate the area and discontinue further air monitoring until the Project Manager has assessed the conditions, developed and implemented a plan to return the atmosphere to acceptable concentration levels and determined that personnel can safely resume operations in the area; (4) all personnel not equipped with air supplying apparatus in accordance with OSHA requirements shall be immediately evacuated from oxygen deficient areas or areas found to have hydrogen sulfide at hazardous levels as defined above and monitoring for oxygen and hydrogen sulfide levels shall continue while any personnel remain in the area.  
When the Project Manager determines that a hazardous condition no longer exists, notice shall be made to the Contractor, and the Engineer.
- 10) Provide all required gas detection equipment in sufficient quantities (with backups), including, but not limited to, gas meter (Gas Tech Model No. GX-82 triple range portable meter or equal), test instruments, sampling lines, safety lines, harnesses, self-contained

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breathing apparatus (Scott Air Pak or equal), protective clothing, explosion-proof lighting, radios, and any other necessary items.

- f. Notices and Reports: The Contractor shall prepare and submit the following notices and reports:

1) Notice of Unsafe Atmosphere

This notice shall be prepared on-site when a hazardous condition is detected and immediately after all notification required above has been completed. The notice shall specify the type(s) and concentration(s) of gas(es) detected, the nature of the gas hazard and the location where, and the time when the hazard has been detected.

This notice shall be presented to the Engineer immediately after being completed.

2) Notice of Safe Atmosphere

When a previously determined hazardous condition has been eliminated, and immediately after completing the notifications required above, the Contractor shall prepare and deliver a Notice of Safe Atmosphere to the Engineer. This notice shall state why or how the gas hazard previously determined has been eliminated.

3) Daily Log Report

This report shall be prepared hourly and utilized as an overall documentation of atmosphere condition. This log report shall be submitted to the Engineer daily. The Engineer shall add any observed unsafe procedure followed by the Contractor.

### 3.02 Dust Control

#### A. General

1. The Contractor shall implement strict dust control measures during active construction periods. These control measures will generally consist of water applications that shall be applied a minimum of once per day during dry weather or more often as required to prevent dust emissions.
2. If air monitoring indicates a stop-work condition as specified in the Health and Safety Requirements (Section 3.01 of this Specification), foam shall be utilized to suppress excessive dust. The foam shall be sprayed at a 1% to 6% by volume concentration as determined by the Engineer depending of the site conditions. Foam shall also be used for odor suppression at the direction of the Engineer.

#### B. Application

1. For water application to soil surfaces following asphalt or concrete removal and prior to excavation, the Contractor shall:
  - a. Apply water with equipment consisting of a tank, spray bar, pump with discharge pressure gauge.
  - b. Arrange spray bar height nozzle spacing and spray pattern to provide complete coverage with water.
  - c. Disperse water through nozzles on spray bar at 1.4kg/cm<sup>2</sup> minimum. Keep areas damp without creating nuisance conditions such as ponding. Excessive

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application of water, resulting in ponding and liquid runoff shall be a basis for the Engineer to close down the Contractor's operations.

2. For water application to soil surfaces during excavation, the Contractor shall:
  - a. Apply water with equipment consisting of a tank, pump with discharge gauge, hoses and mist nozzles.
  - b. Locate tank and spraying equipment so that the entire excavation area can be misted without interfering with excavation equipment or operations. Keep areas damp without creating nuisance conditions such as ponding.
  - c. Apply water spray in a manner to prevent movement of spray beyond the site boundaries.
3. For foam application to soil surfaces during excavation, the Contractor shall:
  - a. Apply foam with equipment consisting of a tank, hoses, pump with discharge gauge and concentration control, used in conjunction with the water spraying equipment.
  - b. Locate tank and spraying equipment so that the entire excavation area can be foamed without interfering with excavation equipment or operations.
  - c. Apply foam in a manner to prevent movement of foam beyond the site boundaries.

**3.03 Spill Control****A. Spill Control and Contingency Plan**

1. Spills: If a spill of petroleum contaminated soils or dangerous materials, such as gasoline, occurs, the following actions shall be taken by the Contractor:
  - a. Immediately notify the Engineer and the appropriate agencies.
  - b. Take immediate measures to control and contain the spill in the smallest area possible. This shall include the following actions:
    - Keep unnecessary people away, isolate the spilled materials, and deny entry.
    - Do not allow anyone to touch spilled material.
    - Stay upwind; keep out of low areas.
    - Keep combustibles away from the spilled material.
    - Use water spray or foam to reduce vapors as needed.
    - Take samples for analysis to determine that clean-up is adequate.
    - Other actions, as needed.
2. Solid Spills – The Contractor shall immediately remove, place, and cover contaminated materials in staging piles, identify the piles as contaminated, and dispose them at an approved off-site facility.
3. Liquid and/or Sludge Spills – The Contractor shall absorb with sand, clean fill, or other absorbent material and dispose of the absorbent/spill mixture in the manner specified in the previous subsection, Solid Spills.

**B. Decontamination Procedures**

Decontamination procedures may be required after cleanup to eliminate traces of the substance spilled or reduce it to an acceptable level as determined by the Engineer. Complete cleanup may require removal of contaminated soils. Personnel decontamination shall be in accordance with the Health and Safety Requirements Section 3.01 of this specification. All contaminated materials including solvents, cloth, soil, and

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wood that cannot be decontaminated shall be properly containerized, labeled, and properly disposed of as soon as possible.

**C. Record and Certification**

At the completion of cleanup, the Contractor shall document the cleanup with records and certification of decontamination. The record and certification shall consist of the following:

1. Identification of the source of the spill;
2. Estimated or actual date and time of the spill occurrence;
3. The date and time cleanup was completed or terminated (if cleanup was delayed by emergency or adverse weather, the nature and duration of the delay);
4. A brief description of the spill location;
5. Sampling data taken prior to the cleanup boundaries and a brief description of the sampling methodology used to establish the spill boundaries;
6. A brief description of the solid surface cleaned and the double wash/rinse method used;
7. Approximate depth of soil excavation and the amount of soil removed;
8. A certification statement signed by the Contractor stating that the cleanup requirements have been met and that the information contained in the record is true to the best of his knowledge.
9. Copies of the documents and certifications which were submitted to the Engineer for review and acceptance.

**4. METHOD OF MEASUREMENT****4.01 Health and Safety Requirements**

The work for providing health and safety requirements will be measured on a lump sum basis.

**5. BASIS OF PAYMENT****5.01 Health and Safety Requirements**

The lump sum price bid for the Health and Safety Requirements shall include all labor materials and equipment necessary to complete the work as detailed below:

Providing safety equipment and protective clothing for site personnel, including maintenance of equipment on a daily basis; replacement of disposable equipment as required; decontamination of clothing, equipment and personnel; and all other Health and Safety activities or costs not paid under other pay items in this Contract.

Providing, installing, operating, and maintaining on-site emergency medical and first aid equipment. This includes all furnishings, equipment, supplies, and maintenance of all medical equipment, and all other Health and Safety items and services for which payment is not provided under other pay items in this Contract.

**A. Spill Control**

Payment shall account for furnishing, installing, and maintaining all spill control equipment and facilities. Payment will include equipment and personnel to perform emergency measures required to contain any spillage and to remove spilled materials and

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soils or liquids that become contaminated due to spillage during work within the exclusion zones and handling of excavated soils and liquids from these areas. This collected spill material will be properly dispose of

**B. Dust Control**

Payment shall account for furnishing, installing, and maintaining dust control equipment and facilities to be used whenever the specified dust levels are exceeded. Payment will include all necessary labor, equipment, clean water, foam, and all other materials required in Section 3.02.

**C. Mobilization/Demobilization**

**1. Mobilization**

Payment shall include but not be limited to:

- a. All work required to furnish, install, and maintain all signs, support zone facilities, parking areas, and all temporary utilities;
- b. All work required to furnish, install, and maintain an office space with phone and utilities for health and safety personnel;
- c. All direct invoiced cost from bonding companies and government agencies for permits and costs of insurance;
- d. All other items and services required for mobilization and site preparation.

**2. Demobilization**

Payment shall include but not be limited to: All work required to sample the area; remove from the site all equipment, temporary utilities and supporting facilities; performance of necessary decontamination and repairs; and other items and services for complete demobilization.

**5.02 Progress Payments**

Progress payments will be computed in accordance with the following:

35% of the lump sum price will be paid when the following items are implemented or mobilized:

- Health & Safety Training
- Implementation Plan
- Environmental and Personnel Monitoring
- Instrumentation
- Spill Control
- Dust Control
- Personnel Protective Clothing
- Communications
- Mobilization

55% will be paid in proportional monthly amounts over the period of work.

10% will be paid when the operation is demobilized and removed from the project site.

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**FIGURE 1.21-1  
SAMPLE TRAINING LOG**

Date: \_\_\_\_\_

Employee In Attendance:

Name	S.S. #	Name	S.S. #
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Description of Training Activity/Topics Covered: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Equipment Demonstrated: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Special Training and Other Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Name of Person Conducting Training Title

Signature: \_\_\_\_\_

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**FIGURE 1.21-2  
SAMPLE DAILY SAFETY LOG**

Date: \_\_\_\_\_

Work Period Covered: \_\_\_\_\_

Weather Conditions: \_\_\_\_\_

Summary of Day's Work Activity: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Equipment Utilized by Safety Monitors: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Protective Clothing and Equipment Being Used By Task: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Physical Condition of Workers (any heat or old stress or other medical problems): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Accidents or Breaches of Procedure: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Description of Monitoring and Air Samples Taken: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Miscellaneous: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_  
Name of Person Conducting Training

\_\_\_\_\_  
Title

Signature: \_\_\_\_\_

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**FIGURE 1.21-3  
SAMPLE AIR MONITORING LOG**

Date: \_\_\_\_\_

Duration of Monitoring: \_\_\_\_\_

Work Location and Task: \_\_\_\_\_

Instrument _____ Reading (time)	Instrument _____ Reading (time)	Instrument _____ Reading (time)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

(Note: If instruments have recorder, attach tape to report. Also note any action levels when exceeded.)

Instrument Calibration: \_\_\_\_\_

Perimeter Samples Collected: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Personnel Sample Collected: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Perimeter and Personnel Sample Results From Previous Day (Provide data when received): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

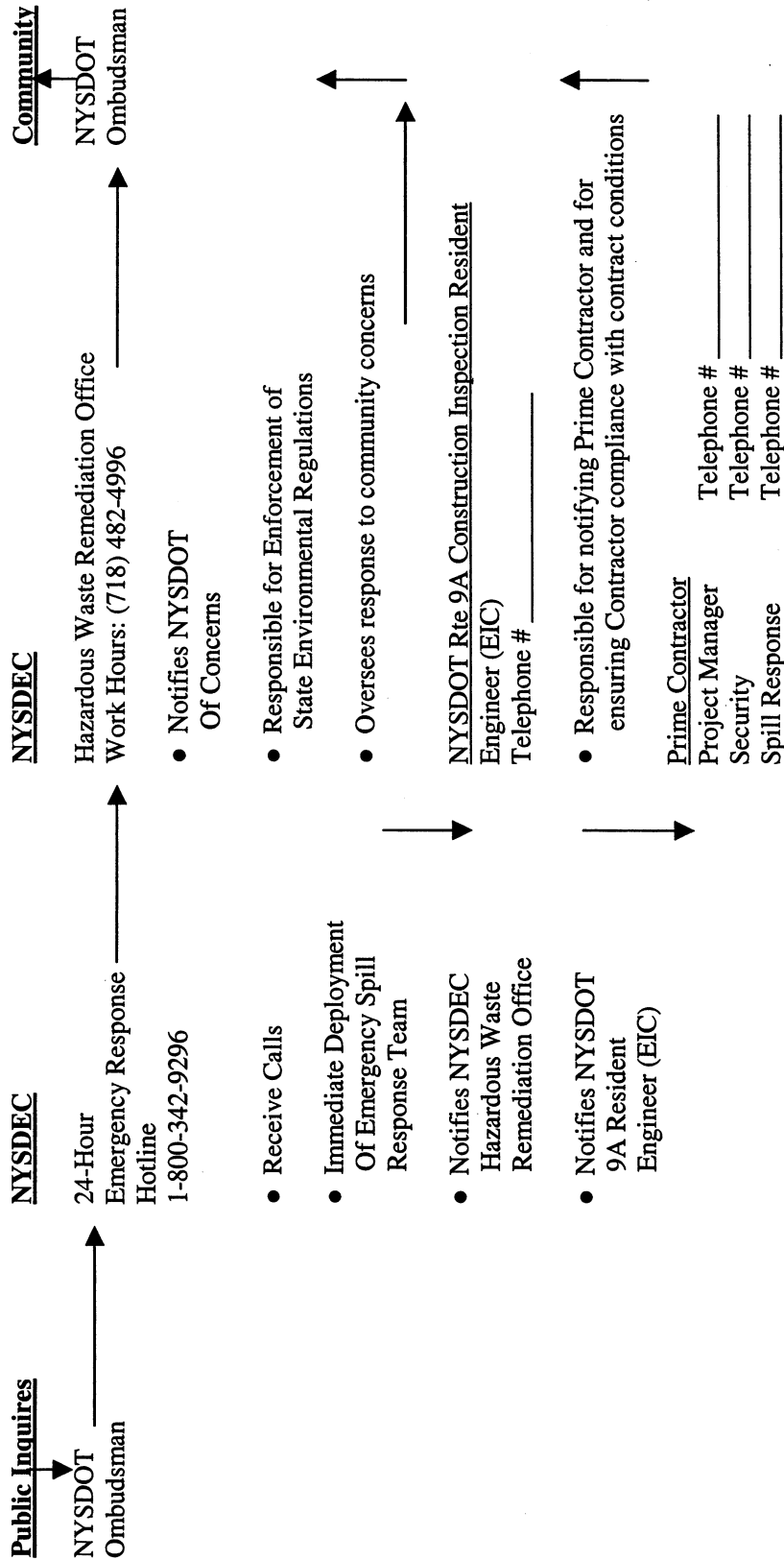
Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Name of Person Conducting Training

\_\_\_\_\_  
Title (Safety Monitor / Safety & Health Specialist)

• Signature: \_\_\_\_\_

**FIGURE 1.21-4  
ROUTE 9A RECONSTRUCTION PROJECT  
EMERGENCY NOTIFICATION FLOW CHART**



• Contractually responsible for complying with specifications (This Chart, with appropriate name and telephone numbers must be included in the Implementation Plan (IP))

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**ITEM 11634.9001 M - RODENT CONTROL - INITIAL SURVEY, BAITING AND  
SANITATION**

**ITEM 11634.9002 M - RODENT CONTROL - MAINTENANCE PROGRAM**

**Description**

- A. Under these items the Contractor shall perform and satisfy the rodent control (extermination) and site sanitation requirements within construction areas, lay down areas, staging areas, dump areas, and bordering areas as designated by the Engineer. This work is to be performed prior to the start of construction and also throughout construction, so that rodents (rats and mice) and other pests do not disperse from or infest construction areas.
- B. The Contractor maintain a cooperative dialogue with appropriate agencies and management representatives of neighboring properties.
- C. The Contractor shall perform the rodent control tasks described herein and also respond to other pest control needs when directed by the Engineer.

**Materials**

- 1. Products
  - A. Furnish and use only pesticide formulations registered by the U.S. Environmental Protection Agency (EPA) and the New York State Department of Environmental Conservation (DEC) where appropriate according to label directions and as acceptable to the Engineer.
  - B. Furnish and use devices and supplies (e.g., traps and bait stations) to facilitate the effectiveness and safety of the pest control program as appropriate and as acceptable to the Engineer.
- 2. Containers
  - A. Use heavy-duty refuse containers with tight-fitting domed lids, with a spring-loaded flap, for disposal of all garbage and trash associated with food. Maintain these containers so there are no opening that allow access by rodents.
  - B. If a dumpster is necessary for the temporary storage of garbage and trash associated with food, it shall not have openings that allow access by rodents. The

**ITEM 11634.9001 M - RODENT CONTROL - INITIAL SURVEY, BAITING AND  
SANITATION**

**ITEM 11634.9002 M - RODENT CONTROL - MAINTENANCE PROGRAM**

dumpster shall have a drain plug if a drain is present, and the doors shall be maintained tightly closed.

**Construction Details**

1. Submittals

- A. Submit to the Engineer copies of pesticide applicator certifications and licenses within ten (10) days of their issuance or renewal for the duration of this Contract.
- B. After performing the survey described under Construction Details Section 6 and before initiating baiting, submit to the Engineer a written description of proposed pest control procedures, indicating materials, quantities, methods, and time schedule. For all pesticides to be used, submit a copy of the pesticide manufacturer's EPA-approved pesticide label with application directions.
- C. Submit to the Engineer documentation of pest control activities and results as follows:
  - 1. Monthly - Submit data sheets with locations of sites treated, method and date of application, amounts and types of bait used, pesticide dosage, number and types of traps set, survey and inspection results, sanitation conditions, complaint calls investigated, any problem that occurred and signature of applicator.
  - 2. Monthly - Submit a map that shows bait stations, manholes and catch basins where baits are being maintained.
- D. At least 10 days prior to occupancy of the Contract area, submit to the Engineer for review a written description of the sanitation procedures to be used.

2. Qualifications

- A. The Contractor shall perform this work at all times in accordance with the

**ITEM 11634.9001 M - RODENT CONTROL - INITIAL SURVEY, BAITING AND  
SANITATION**

**ITEM 11634.9002 M - RODENT CONTROL - MAINTENANCE PROGRAM**

following minimum standards and as acceptable to the Engineer.

1. The Contractor, key personnel and applicator shall have experience and/or training in vertebrate pest management and integrated pest management; have experience with various rodent control techniques, equipment, and strategies; and have knowledge of experience with techniques to reduce non-target hazards.
2. Applicators shall be licensed and certified by the New York State DEC.
3. Coordination
  - A. The Contractor shall not proceed with the construction designated on the Plans until written release is issued by the Engineer, after successful completion of the initial phase of rodent control.
  - B. Initiate the work before field mobilization begins for the construction designated on the Plans and with adequate timing to achieve control before environmental disruptions and site work. Provide a maintenance program until construction is completed and all equipment and materials are removed, as determined by the Engineer.
  - C. Perform this work in such a manner and post warning signs such that toxicants or other control tools do not pose a hazard to persons, domestic animals, or non-target wildlife.
4. Permits
  - A. Obtain and maintain in coordination with the Engineer appropriate permit(s) from city or state agencies for pest control activities associated with this work.
  - B. Obtain and maintain in coordination with the Engineer all right of entry permits required for the performance of this work. This includes all utilities and private properties to which entrance is required.
5. Meetings

**ITEM 11634.9001 M - RODENT CONTROL - INITIAL SURVEY, BAITING AND  
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**ITEM 11634.9002 M - RODENT CONTROL - MAINTENANCE PROGRAM**

- A. Before proceeding with the work, all pest control personnel shall attend a two-hour orientation session held by the Engineer and discuss planned pest control methods and coordination.
6. Survey
- A. Prior to baiting, survey the proposed construction area and accessible or observable bordering areas designated herein and record signs of rodent activity and sanitation conditions. Maintain survey records in the manner described under Construction Details Section 10.
- B. Thoroughly inspect construction areas and accessible or observable bordering areas designated herein, and any nearby areas designated by the Engineer, for rodent activity and sanitation deficiencies monthly throughout the duration of this contract and in accordance with the work schedule. Maintain inspection records in the manner described under Construction Details Section 10.
7. Application for Rodent Control
- A. Apply rodenticide in strict accordance with EPA-approved label directions and NYSDEC regulations. Maintain records of all bait placements in the manner described under Construction Details Section 10.
- B. Where appropriate, use properly secured and tamper-resistant bait stations consistent with EPA regulations. Remove manhole covers and ventilate manholes according to requirements of appropriate agencies and utility companies. Use a police, or utility detail as appropriate. Coordinate the work with appropriate municipal agencies and utility companies. Individually number and properly identify all bait stations.
- Baited areas must be posted with warning signs advising the public that rat bait has been placed in the area. The signs are to be large (425mm X 550mm) and clearly printed and securely fixed.
- C. Surface Applications

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## 1. Initial Surface Baiting

Rid the construction area of all detectable rodents before construction begins, as acceptable to the Engineer. Bait all observable rodent burrows. Install and secure bait stations at regular and appropriate intervals and locations, and document rodent activity (burrows, droppings, bait consumed, dead rodents). Replenish bait and shift bait stations as necessary to ensure complete control of rodent populations. Bait edge and accessible bordering areas designated on the Plans as necessary to ensure that rodents will not be dispersed by construction activities and that rodents will not infest work areas.

## 2. Maintenance Surface Baiting

Establish a maintenance baiting program prior to the start of construction. This includes construction areas and accessible bordering areas designated herein, as acceptable to the Engineer. Check bait placements weekly. Use survey and baiting data to determine the most effective distribution of baiting locations and bait quantities. Shift and distribute bait and bait stations as appropriate to ensure continued control.

## D. Subsurface Applications

## 1. Initial Subsurface Baiting

Apply appropriate baits to control rodent populations in manholes and catch basins. This will involve suspending and securing bait using noncorrosive wire (e.g., 24 gauge plastic coated). Place bait in all accessible manholes and catch basins within the construction work area. In addition, bait an appropriate set of manholes and catch basins in the blocks bordering the work area as designated herein and as acceptable to the Engineer. Identify all baited manholes and catch basins with a standardized paint mark on the street and, a numbered tag to be attached to the suspending wire. Approximately seven days after completion of the first baiting, check all manhole and catch basin baits and record estimates on the amount of bait consumed. Replenish or increase the amount of bait applied according to the amount consumed and as acceptable to

**ITEM 11634.9001 M - RODENT CONTROL - INITIAL SURVEY, BAITING AND  
SANITATION****ITEM 11634.9002 M - RODENT CONTROL - MAINTENANCE PROGRAM**

the Engineer. Repeat this process again approximately fourteen days later and until there is little or no bait consumed. Check manholes and catch basins weekly when they repeatedly have 100 percent of the bait consumed.

2. Maintenance Subsurface Baiting

Prior to the start the construction, establish a maintenance baiting program appropriate for the rodent infestation patterns identified during initial program appropriate for the rodent infestation patterns identified during initial subsurface baiting. This program shall ensure continued control and shall be performed as acceptable to the Engineer. Maintain bait in manholes and catch basins that have rodent activity and those that had activity during initial baiting as necessary. Check each bait weekly or more often according to rodent activity levels and the recent history of bait consumption. Use utility maps and baiting data to determine the most effective distribution of baiting locations and bait quantities. Shift and distribute baiting locations as necessary to ensure adequate interception points for controlling immigrating rodents.

E. Cleanup

1. Remove visible rodent carcasses and dispose of them daily consistent with the pesticide label directions and applicable codes, laws, and regulations.
2. Upon completion of any pest control operations at the site, remove remaining bait and dispose of it according to the pesticide label and applicable codes, laws, and regulations. Also remove all wires used for subsurface baiting and any bait stations or traps.

8. Sanitation

- A. Prior to construction and throughout the duration of this Contract, identify and document harborage and food sources available to rodents on the construction site and in observable bordering areas designated herein. This includes any littering or improper or insufficient use of trash receptacles in construction areas. It also includes any bordering areas with sanitation conditions or structural deficiencies that violate City or

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SANITATION****ITEM 11634.9002 M - RODENT CONTROL - MAINTENANCE PROGRAM**

State sanitation codes.

- B. Maintain records of sanitation conditions in the manner described under Construction Details Section 10.
- C. Maintain construction and laydown areas and their perimeters free of trash, garbage, weeds, debris and unnecessary or deteriorated hay and straw bales. Provide and enforce proper use of refuse containers to ensure that rodents and other pests are not harbored or attracted.
- D. Designate specific locations as lunch and coffee break areas to prevent random disposal of garbage and trash. Keep those areas free of litter and garbage, and provide refuse containers. Keep refuse containers upright with their lids shut tight.
- E. Have all refuse containers (described in Materials Section 2), emptied daily to maintain site sanitation. If a dumpster is used (as described in Materials Section 2), empty it at least weekly and keep the area under and around it clean.
- F. Notify the Engineer within 24 hours whenever rodents (rats or mice) or signs of rodent activity (burrows or droppings) are observed in construction or laydown areas.

9. Complaint Calls

- A. During construction, respond to pest-related complaints from the adjacent neighborhood within 12 hours when directed by Engineer. Inspect the particular premises and adjacent areas for sanitation and structural deficiencies and also signs of historic and recent pest activity. Provide sanitation and structural maintenance information to the property owner or manager. Use pesticides or traps as necessary and appropriate to resolve the complaint when there is a relationship between the pest infestation and construction activities, or when directed by the Engineer.
- B. Maintain records of all complaints investigated, including location, contact person, inspection results, and actions taken. Document the relatedness of the pest infestation to construction activities.

**ITEM 11634.9001 M - RODENT CONTROL - INITIAL SURVEY, BAITING AND  
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**ITEM 11634.9002 M - RODENT CONTROL - MAINTENANCE PROGRAM**

10. Record Keeping
  - A. Use standard data sheets provided or approved by the Engineer to maintain accurate records of date, placement, type, and amount of pesticides or other control tools (e.g., traps) applied. Similarly, maintain records of surveys, inspection, changes in pest activity, sanitation conditions, or when directed by the Engineer.

**Method of Measurement**

The quantity to be paid for under the item, Initial Survey, Baiting and Sanitation, will be on a lump sum basis for the initial work completed in accordance with the plans, specifications and direction of the Engineer.

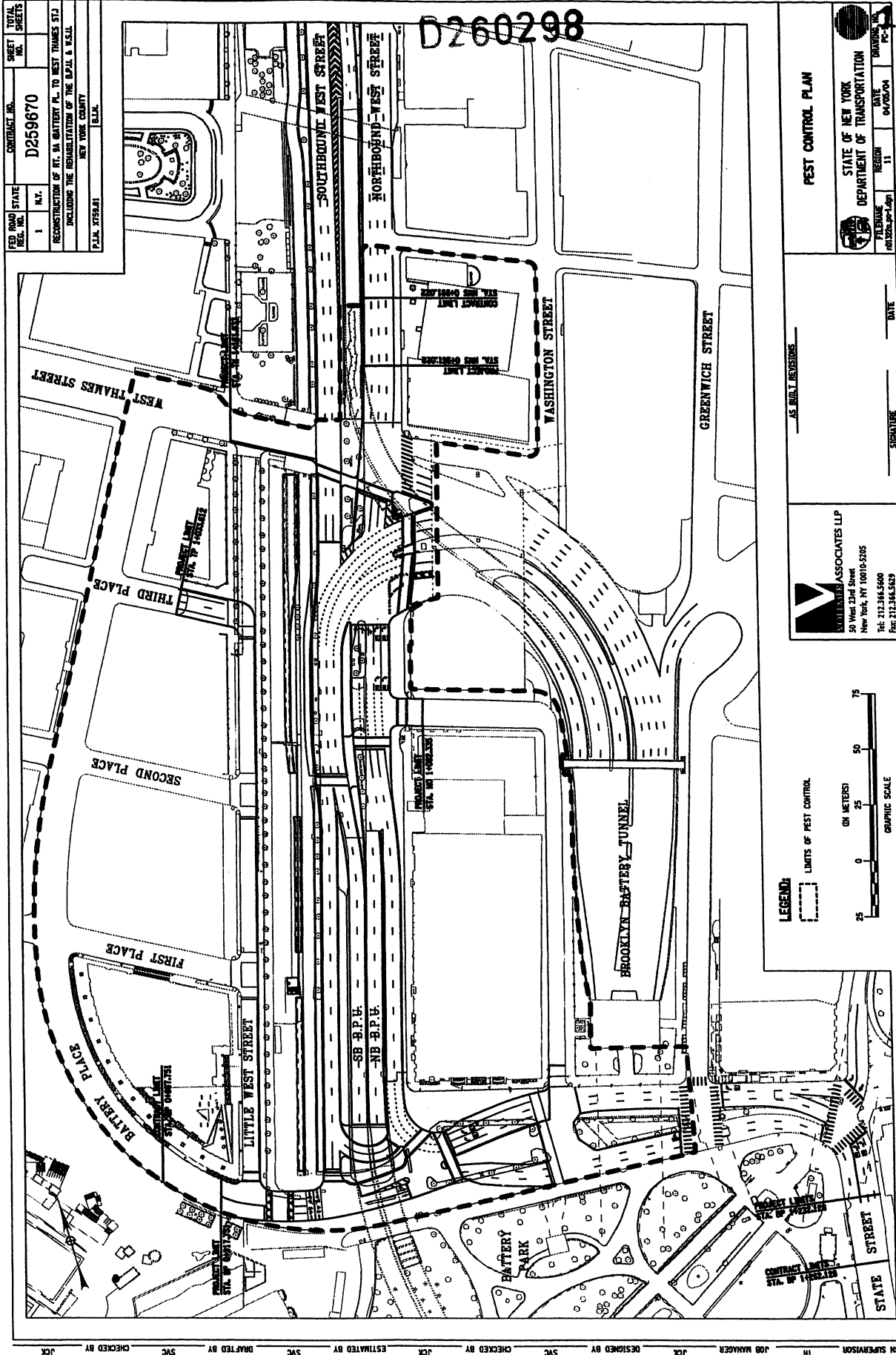
The quantity to be paid for under the item, Maintenance Program, will be on a per month basis for the maintenance program completed in accordance with the plans, specifications and direction of the Engineer.

**Basis of Payment**

The lump sum price bid for the item, Initial Survey, Baiting and Sanitation, shall cover the cost of all labor materials and equipment necessary to complete the initial survey, planning, documentation, baiting and inspection of the construction and adjacent areas both surface and subsurface as well as sanitation inspection, documentation and corrective measures.

The unit price bid per month for the item, Maintenance Program, shall cover the cost of all labor, materials and equipment necessary to complete the weekly inspections, re-baiting, cleanup and rodent control documentation, garbage disposal, cleanup and sanitation documentation as well as to receive, document, investigate and respond to complaints.

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FED. ROAD DIST. NO.	STATE	CONTRACT NO.	SHEET NO.	TOTAL SHEETS
1	N.Y.	D259870		
RECONSTRUCTION OF RT. 9A BATTERY PL. TO WEST THAMES ST. INCLUDING THE RECONSTRUCTION OF THE Bx15 & BxL1 NEW YORK COUNTY PLAZA STREETS				
E.L.A.				

**PEST CONTROL PLAN**

STATE OF NEW YORK  
DEPARTMENT OF TRANSPORTATION

FILE NO. 11  
REASON 11  
DATE 04/28/04  
DRAWN BY  
CHECKED BY  
DESIGNED BY  
ESTIMATED BY  
DRAFTED BY  
CHECKED BY  
DESIGNED BY  
JOB MANAGER  
TH

AS BUILT REVISIONS \_\_\_\_\_ DATE \_\_\_\_\_

**SKULL & CROSS ASSOCIATES LLP**  
50 West 23rd Street  
New York, NY 10010-2105  
Tel: 212-346-5600  
Fax: 212-346-5629

**LEGEND:**

LIMITS OF PEST CONTROL

0 25 50 75  
METERS  
GRAPHIC SCALE

DESIGN SUPERVISOR  
JOB MANAGER  
TH  
DESIGNED BY  
SVC  
CHECKED BY  
JCK  
ESTIMATED BY  
SVC  
DRAFTED BY  
SVC  
CHECKED BY  
JCK  
DESIGNED BY  
SVC  
JOB MANAGER  
TH  
DATE/TIME = 04/21/2004  
USER = VA  
FILE NAME = D:\p044\W070\c04\newo\m12202a.plt













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AREA \_\_\_\_\_

COMPLAINT INVESTIGATION

NAME \_\_\_\_\_ DATE \_\_\_\_/\_\_\_\_/\_\_\_\_ TIME \_\_\_\_\_

ADDRESS \_\_\_\_\_ TELEPHONE \_\_\_\_\_

INITIAL VISIT  FOLLOW-UP VISIT  NOT AT HOME

CASE NO. \_\_\_\_\_

OUTSIDE INFESTATION:

RATS  MICE

AREA:

- RESIDENTIAL  PARKING LOT
- RESIDENTIAL/COMMERCIAL  PARK
- COMMERCIAL  WATERFRONT
- VACANT LOT  PUBLIC INSTITUTION
- RESTAURANT  CONSTRUCTION AREA
- MARKET/FOOD PLANT  \_\_\_\_\_

SIGN:

- BURROWS  DROPPINGS
- RUNWAY  RAT SIGHTING
- GNAWING  \_\_\_\_\_

FOOD SOURCES:

- GARBAGE  REFUSE STORAGE
- PETS  NEIGHBORS
- GARDEN  LITTER
- \_\_\_\_\_

EVALUATION:

- HISTORIC PROBLEM
- SIGN RECENT
- MINOR INFESTATION
- WELL ESTABLISHED INFESTATION
- NOT RELATED TO CONSTRUCTION

TREATMENT:

- EDUCATION  ENFORCEMENT
- BAIT: \_\_\_\_\_ AMOUNT: \_\_\_\_\_  
 BAIT STATION  BURROW
- POWDER: \_\_\_\_\_ AMOUNT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_
- TRAPS: \_\_\_\_\_ NO.: \_\_\_\_\_
- PROOFING RECOMMENDED
- \_\_\_\_\_
- COMPLETE
- REQUIRES ADDITIONAL VISIT(S)

INSIDE INFESTATION:

RATS  MICE

TYPE OF STRUCTURE:

- RESIDENCE
- APARTMENT
- OFFICE
- FOOD BUSINESS
- MANUFACTURING
- RETAIL
- \_\_\_\_\_

INFESTATION AREA:

- BASEMENT
- KITCHEN, PANTRY
- BATHROOMS
- LIVING/FAMILY ROOMS
- BEDROOMS
- FOOD STORAGE
- NON-FOOD STORAGE
- OFFICE
- \_\_\_\_\_

SIGN:

- DROPPINGS  URINE ODOR
- RUNWAYS, RUB MARKS  SIGHTING
- GNAWING  FEEDING

FOOD SOURCES:

- GARBAGE  REFUSE STORAGE
- STORED FOODS  PET FOOD
- \_\_\_\_\_

EVALUATION:

- HISTORIC PROBLEM
- SIGN RECENT
- MINOR INFESTATION
- WELL ESTABLISHED INFESTATION
- NOT RELATED TO CONSTRUCTION

TREATMENT:

- EDUCATION
- BAIT: \_\_\_\_\_ AMT: \_\_\_\_\_  
 BAIT STATION  PROTECTED AREA
- POWDER: \_\_\_\_\_ AMT: \_\_\_\_\_  
LOCATION: \_\_\_\_\_
- TRAPS: \_\_\_\_\_ NO.: \_\_\_\_\_
- PROOFING RECOMMENDED
- \_\_\_\_\_
- COMPLETE
- REQUIRES ADDITIONAL VISIT(S)

COMPANY \_\_\_\_\_ APPLICATOR \_\_\_\_\_

GIVE ADDITIONAL DETAILS ON FORM "NARRATIVE - COMPLAINT INVESTIGATION."

**D260298**

CASE NO.

**1467**

DATE: \_\_\_\_\_

\_\_\_\_/\_\_\_\_/\_\_\_\_

**NARRATIVE - COMPLAINT INVESTIGATION**

**1. WHAT IS THE HISTORY OF PEST PROBLEMS?**

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**2. DESCRIBE THE NEIGHBORING CONDITIONS.**

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**3. DESCRIBE THE CURRENT INFESTATION.**

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**4. WHAT MUST THE OWNER DO TO SOLVE THE CURRENT PROBLEM?**

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**5. WHAT MUST THE CITY, PORT AUTHORITY, AND LMDC DO TO SOLVE THE PROBLEM?**

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**ADDITIONAL COMMENTS:**

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**ITEM 634.9997--11 – MECHANICAL ELEMENTS****DESCRIPTION**

This work consists of HVAC and Plumbing systems for a new Liberty Street Bridge Extension to Cedar Street. The Liberty Street Bridge Extension to Cedar Street consists of a new bridge connecting to the existing Liberty Street Bridge, a stair at Cedar Street, an elevator at Cedar Street and an elevator machine room.

The scope of work is as shown on the construction documents and shall include:

HVAC work for the Liberty Street Bridge Extension to Cedar Street:

- Provide and install a packaged heat pump system on the roof of the elevator machine room.
- Provide and install dampers in the elevator machine room.
- Provide and install a gravity roof ventilator on the roof of the elevator machine room.
- All HVAC work associated with the mechanical systems for a complete installation.
- All testing, adjusting, cleaning, start-up, training, documentation and spare parts for the above systems.

Plumbing work for the Liberty Street Bridge Extension to Cedar Street:

- Provide and install an oil/water separator system in the elevator machine room, and underground piping to the storm drainage system.
- Provide and install a storm drainage system for the bridge, elevator and elevator machine room, and underground piping to the catch basin.
- Provide and install a submersible sump pump in the pit of the elevator shaft and connections to the oil/water separator
- All plumbing work associated with the mechanical systems for a complete installation.
- All testing, adjusting, cleaning, start-up, training, documentation and spare parts for the above systems.

The Special Note entitled “Liberty Street Bridge Extension to Cedar Street - Mechanical General Requirements” provides additional information regarding the work to be performed under this item.

**MATERIALS**

Refer to the Special Note entitled “Liberty Street Bridge Extension to Cedar Street - Mechanical General Requirements” for additional materials requirements.

**CONSTRUCTION DETAILS**

**ITEM 634.9997--11 – MECHANICAL ELEMENTS**

The Contractor shall provide shop drawings for all mechanical equipment and materials in accordance with the Contract Documents, for approval by the Engineer.

The Contractor shall visit the site and become completely familiar with the structure and its surroundings. Prior to beginning any work under this item, the Contractor shall submit detailed plans and computations to the Engineer for review and approval. Such review, however, shall not relieve the Contractor of the responsibility for the adequacy of design or the accuracy of fit.

The construction details shall be in conformance with the requirements of the Special Note entitled "Liberty Street Bridge Extension to Cedar Street - Mechanical General Requirements". Where applicable, the prevailing specifications will include the current New York State Department of Transportation Standard Specifications for Highway Bridges (2002). If an appropriate NYSDOT standard is not available, the design and details shall be in accordance with nationally recognized codes and standards as approved by the Engineer.

The work shall be performed in a manner and sequence that minimizes the interference with, and inconvenience to, the traveling public and the abutting property owners. The Contractor shall be responsible for the workmanship, upkeep and safety of his mechanical work in the work zone during construction.

All welding required shall be performed in accordance with the provisions of the NYSSCM, and welding procedures are subject to approval by the Engineer.

Mechanical Components identified in the Special Note "Liberty Street Bridge Extension to Cedar Street – Mechanical General Requirements" that directly relate to this work include but are not limited to:

- Packaged Heat Pump System
- Dampers
- Gravity Roof Ventilator
- Oil/Water Separator Tank
- Piping, Fittings and Piping Joints
- Drains
- Submersible Sump Pump

**METHOD OF MEASUREMENT**

All of the work required for the mechanical elements on the Liberty Street Bridge Extension to Cedar Street, and for obtaining all required permits, will be measured on a lump sum basis.

**BASIS OF PAYMENT**

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**ITEM 634.9997--11 – MECHANICAL ELEMENTS**

The lump sum bid for the “Liberty Street Bridge Extension to Cedar Street – Mechanical Elements” shall include the cost of all engineering, labor, material, and equipment necessary to complete the work in accordance with the Contract Documents including the Special Note entitled “Liberty Street Bridge Extension to Cedar Street - Mechanical General Requirements”.

Progress payments will be made based on percent completion of the work as determined by the Engineer.

**Item 634.9999--11 FURNISH AND INSTALL ELEVATOR FOR THE LIBERTY STREET BRIDGE EXTENSION**

**Description.** The work shall consist of furnishing, placing, and testing, an elevator at the Liberty Street Bridge Extension.

Examine the Plans, Specifications, and Special Notes for the requirements that affect the work of this specification.

The furnishing and placing of the elevator tower including foundation and equipment room, elevator tower enclosure, and mechanical and electrical equipment is covered under other specifications included in the Proposal.

**Materials.**

All materials used shall comply with the requirements of the appropriate sections of Section 700 – Materials, or as established by the Special Notes and/or plans.

**Construction Details.**

The elevator shall be furnished, placed, and tested in accordance with the requirements in the Special Notes entitled “Liberty Street Pedestrian Bridge Hydraulic Elevator”.

**Method of Measurement.** Measurement shall be taken as each elevator actually furnished, placed, and accepted by the Engineer.

**Basis of Payment.** The unit price bid for the elevator will include the cost of furnishing all engineering, labor, materials, and equipment necessary to complete the work.

**ITEM 637.1094--11 M - ENGINEER'S OFFICE, TYPE H****DESCRIPTION**

This work shall consist of providing, furnishing and maintaining an Engineer's Office for use as a Public Information Office and for the exclusive occupancy by the Department, consulting field engineers and use by the public.

**MATERIALS**

The requirements of subsection 637-2.01 and 637-2.02 shall apply with exception of Items "C", "J", "R" and "V".

The requirement of subsection 637-2.04E shall apply except as modified herein. The office shall provide a minimum of 100 square meters of floor space and shall be portioned to four rooms, three small (two at 11 square meters, one at 15 square meters) and 1 large room. The office shall be located on the first floor of a non-elevator building or any floor of an elevator equipped building. Alternate layouts may be submitted for approval. The proposed office must be approved by the Engineer.

The furnishings shall be identical to the Type E Office with following modifications:

**Deletions**

- Drafting Tables
- Drafting Stools
- Fire Resistant Cabinets
- Adding Machines
- 7 Parking Lot Spaces

**Additions**

- 4 – Suitable office desks with drawers and locks.
- 4 – Desk chairs (swivel, rock, five-caster, arms).
- 12 – Office chairs (non-folding, arms).
- 12 – Folding chairs.
- 4 – Office tables 0.9 m x 1.8 m.
- 4 – Office tables 0.9 m x 3.6 m.
- 2 – Coat Racks with 60 wooden hangars
- 4 – Vertical plan racks, twelve sets.
- 6 – Telephones on separate lines all interconnected. The telephone system and arrangement shall be submitted to the Engineer for approval prior to installation.
- 4 – Metal storage cabinets

The requirements of subsection 637-2.02I shall apply except as modified herein. The office shall have a minimum of 2 toilet facilities.

The requirements of subsection 637-2.02P shall apply except as modified herein. The office shall have 1 photocopy machine with autofeed, dual side copy capability and sorting capability.

The requirements of subsection 637-2.02Z shall apply except as modified herein. The office shall have 1 telephone-fax machines, with a separate telephone line.

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**ITEM 637.1094--11 M - ENGINEER'S OFFICE, TYPE H**

**CONSTRUCTION DETAILS**

The construction details shall be in accordance with subsection 637-3.01 except as modified herein. The office shall be a rented space located inside an existing office building, not a trailer, located within 0.5 kilometers from the limits of the project.

**METHOD OF MEASUREMENT**

Measurement will be in accordance with subsection 637-4.01.

**BASIS OF PAYMENT**

Payment will be made in accordance with subsection 637-5.01

**ITEM 15637.1096 M - INSPECTION VEHICLES(S)**

**DESCRIPTION.** This work shall consist of furnishing, for the duration of the contract, a total of one motor vehicle(s) for the transportation of Department of Transportation employees or representatives and their equipment. The vehicles(s) will be used by survey crews and/or inspectors for the performance of official duties. In performance of official duties the motor vehicles(s) may be used both "on and off road" as well as used beyond the specific contract limits in order to visit multiple project work sites and/or related sites. State employees assigned to the contract as inspection staff may also use the vehicle for commuting purposes to and from their domicile. The Engineer may use all, part, or none of this item.

**MATERIALS.** The inspection vehicle(s) shall be as indicated below:

<u>Quantity</u>	<u>Description</u>	<u>Cab</u>
_____	Front wheel drive compact automobile; 2 or 4 door w/4 seats	
_____	Front wheel drive mid-size automobile; 4 door w/6 seats	
_____	2-wheel drive full size pickup; regular w/3 seats	
_____	2-wheel drive full size pickup; extended w/5 seats	
_____	2-wheel drive compact pickup; regular w/3 seats	
_____	2-wheel drive compact pickup: extended w/5 seats	
<u>1</u>	4-wheel drive full size pickup; regular w/3 seats	
_____	4-wheel drive full size pickup; extended w/5 seats	
_____	4-wheel drive compact pickup; regular w/3 seats	
_____	4-wheel drive compact pickup; extended w/5 seats	
Total	<u>1</u>	

An equivalent type vehicle may be substituted with the Engineer's written approval. However, in no case shall the vehicles(s) provided be over four (4) years old or have over 40,000 miles on the odometer as of the delivery date. The supplied vehicle(s) shall be of such durability to carry occupants and equipment over rough terrain and contain sufficient weather protection for both the occupants and equipment.

The vehicle(s) shall be equipped with or meet the following minimum specifications:

- 1) Engine: Manufacturer's Standard 4 or 6 cylinder
- 2) Transmission: Automatic
- 3) Drive: Manufacturer's Standard two (2) or four (4) wheel as required above
- 4) Steering: Power
- 5) Air Conditioning
- 6) Interior Option: Manufacturer's base level
- 7) Mirrors: Left, Right and Center
- 8) All Standard Manufacturer equipment and accessories including spare tire, jack, owner's manual, etc. shall be included with the vehicle(s).

**ITEM 15637.1096 M - INSPECTION VEHICLES(S)**

An owner's policy of liability insurance for the vehicle(s) shall be provided as required by Article 6 of the Vehicle and Traffic Law (Motor Vehicle Financial Security Act) and the vehicle(s) are to be properly registered as required by Article 14 of the Vehicle and Traffic Law (Registration of Motor Vehicles).

A portable revolving sealed beam, amber color, warning light (for placement on the cab roof/vehicle exterior) shall be included for each vehicle provided. The light shall be controlled by a removable power cord connection into the vehicle cigarette lighter, or equivalent as approved by the Engineer. The power connection must be of sufficient length/design for placement as to not interfere with vehicle operation.

**CONSTRUCTION DETAILS.** The vehicle(s) will be driven by operators possessing a valid driver's license. The vehicle(s) shall be made available and shall be returned upon 14 calendar days notice from the Engineer-in-Charge.

The Contractor shall provide fuel, oil, proper maintenance, tires, and replacement parts as required to keep the vehicle in safe operating condition, and undertake all repairs, including repairs arising from the vandalism, accidents or other damages. In the event that any vehicle requires maintenance or repairs which cannot be completed on the same day, a comparable replacement vehicle shall be provided while the vehicle is out of service. If the vehicle is lost or stolen, the Contractor shall replace the vehicle within five (5) business days with a comparable vehicle.

The vehicle shall be provided for this contract and shall be returned to the Contractor within fourteen (14) days after either the final acceptance of work, or substantial completion, whichever comes first. Contractor owned vehicles provided pursuant to this contract shall remain the property of the Contractor throughout and at the completion of the contract period.

Within five (5) business days of receipt of notice to commence work, the contractor shall make the vehicle available for inspection by the Engineer. Upon determination that the vehicle satisfies requirements, the Contractor shall make arrangements for delivery to the site on the date specified by the Engineer.

**METHOD OF MEASUREMENT.** The quantity to be paid for under this item will be the number of vehicle calendar weeks during which each vehicle is available for use by the Department's Engineers or representatives. A calendar week is defined as seven consecutive twenty-four hour calendar days.

A proportionate deduction, to the nearest one fourteenth (1/14) vehicle calendar week (½ day), will be made for each day, or portion thereof, a vehicle is inoperative or unavailable during its required use under this item.

**BASIS OF PAYMENT.** The unit price bid per vehicle calendar week shall include all costs in connection with furnishing properly registered vehicles, maintaining the vehicles (including repairs, tires, lubrication, fuel, washing, etc.), and providing an owner's policy of liability insurance for the vehicles in conformance with Section 107-06, B, of the Standard Specifications.

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**ITEM 11637.13 M - ENGINEER'S OFFICE - TYPE F**

**DESCRIPTION:**

This work shall consist of providing, furnishing and maintaining an Engineer's office for the exclusive use and occupancy by the Department and consultant field engineers.

**MATERIALS:**

The requirements of subsection 637-2.01 and 637-2.02 shall apply with the exception of Items "E", "T", "P", and "Z".

The requirement of subsection 637-2.04E shall apply except as modified herein. The office shall provide a minimum of 200 square meters of floor space and shall be portioned to five rooms, three small (two at 11 square meters, one at 15 square meters) and 2 large rooms.

The furnishings shall be identical to the Type E Office with the following modifications:

22 - Suitable office desks with drawers and locks

35 - Office chairs

9 - Telephones on separate lines all interconnected. The telephone system and arrangement shall be submitted to the Engineer for approval prior to installation.

22 - Lockers

The requirements of subsection 637-2.02I shall apply except as modified herein. The office shall have a minimum of 2 toilet facilities, with a least 1 shower facility.

The requirements of subsection 637-2.02P shall apply except as modified herein. The office shall have 2 photocopy machines with autofeed, dual side copy capability and sorting capability.

The requirements of subsection 637-2.02Z shall apply except as modified herein. The office shall have 2 telephone fax machines, with separate telephone lines.

**CONSTRUCTION DETAILS:**

The Construction details shall be in accordance with subsection 637-3.01.

**METHOD OF MEASUREMENT:**

Measurement shall be in accordance with subsection 637-4.01.

**BASIS OF PAYMENT:**

Payment will be made in accordance with subsection 637-5.01.

**ITEM 637.20 20 - MOBILE TELEPHONE****DESCRIPTION**

This work shall consist of furnishing and maintaining mobile telephone equipment and service.

**MATERIALS**

The mobile telephone shall include all the components specified in the contract proposal special note for this pay item. The mobile telephone shall adhere to the technical specifications as specified in the contract proposal special note for this pay item.

The number of mobile telephones to be supplied shall be identified in the contract proposal special notes or by the Engineer. The capabilities (whether it functions both as a two-way radio and as a telephone, or only as a two-way radio) shall also be identified in the contract proposal special notes or by the Engineer.

The Contractor is required to provide maintenance service and repairs as necessary (A maintenance/extended warranty contract for the duration of the contract is reimbursable).

All necessary hardware, cables, operating manuals, and other pertinent media for all the components shall be provided. The Contractor shall obtain all necessary FCC licenses, permits, and copies of FCC Regulations required for the operation of the equipment furnished.

**CONSTRUCTION DETAILS**

All equipment and services furnished shall be subject to approval by the Engineer. The Contractor shall submit to the Engineer a list of at least 3 service providers (or all available) with their available phone equipment and calling plan options. The list shall include the following information for each service provider:

- Service provider - include contact information (customer service telephone number and website address if available)
- Available calling plans
- Available telephone equipment (including a picture of the telephone)
- Service contract details (year commitment, etc.)
- Pricing information

The Engineer shall select the service provider, equipment, and calling plan to be provided. The Engineer can select an option from the Contractor's list or require the Contractor to submit a new list.

Upon the Engineer's selection of the equipment and service to be provided, the Contractor shall provide the designated equipment within one week to the Engineer. The equipment and service shall be maintained by the Contractor at all times.

As soon as the mobile telephones are provided, the Contractor shall supply qualified instruction to Department personnel and their authorized representatives, regarding their proper operation.

The mobile telephones shall be for the exclusive use of Department personnel and their authorized representatives.

In a timely manner, the Contractor shall provide the Engineer with legible copies of the monthly bills for the mobile telephone(s) provided. The bills shall show the number of minutes usage, or voice message units, and the total usage charges for the billing period.

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**ITEM 637.20 20 - MOBILE TELEPHONE**

The equipment shall be maintained and remain in service until either: (a) the Engineer requests its removal in writing, (b) the State relinquishes the Engineer's field office and the mobile phone(s) is relinquished as part of the Engineer's field office, or (c) the later of either thirty (30) days after the final contract acceptance date or thirty (30) days after the date the Contractor provided the last documentation necessary for processing the final contract acceptance. At that point, ownership of the equipment supplied by the Contractor shall revert back to the Contractor.

The Contractor shall maintain all furnished equipment and services in good working condition and shall provide replacement, due to breakdown, damage, loss, or theft within 24 hours of notification.

**METHOD OF MEASUREMENT**

The mobile telephone will be measured on a fixed price Dollar Cents pay unit basis.

**BASIS OF PAYMENT**

The pay item is a 'draw down' item. As materials are supplied, the receipts for the materials shall be submitted to the Engineer. The Contractor will be reimbursed for receipted costs of materials plus 5% for profit and overhead ('materials' includes all physical materials, software, labor, services, and service contracts provided to furnish, install, maintain, and remove all of the components of the system).

The Contractor will be reimbursed for any receipted penalties incurred for breaking an Engineer-approved service contract with the telephone service provider. If the length of the service contract extends excessively beyond the estimated completion of construction, the Contractor will only be reimbursed for penalties relating to the remainder of the service year in which the contract was terminated.

Unless a credit is provided by the service provider, the Contractor will be penalized for the number of days of non use of the equipment due to service interruption or malfunctioning of the equipment. The penalty will be based on the per-day cost derived from the bill.

No payment will be made for service during periods of contract extensions of time where engineering charges are assessed.

The total cost shown in the itemized proposal for this pay item will be considered the price bid even though payment will be made only for actual equipment and materials supplied. The unit price amount is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figure will be disregarded, and the original price will be used to determine the total amount bid for the contract.

**ITEM 637.22 20 – TWO-WAY RADIO SYSTEM****DESCRIPTION**

This work shall consist of furnishing and maintaining a two-way radio system for the duration of the contract.

**MATERIALS**

The two-way radio system shall include the components specified in the contract proposal special note for this pay item. This specification can be used to supply select components of the system (example: just the handheld radios), without all the components being required to be provided. The system shall adhere to the technical specifications as specified in the contract proposal special note for this pay item.

The quantity of each of the various components of the two-way radio system to be supplied shall be identified in the contract proposal special notes or by the Engineer.

The Contractor is required to provide maintenance service and repairs as necessary (A maintenance/extended warranty contract for the duration of the contract is reimbursable).

All necessary hardware, cables, operating manuals, and other pertinent media for all the components shall be provided. The Contractor shall obtain all necessary FCC licenses, permits, and copies of FCC Regulations required for the operation of the equipment furnished.

**CONSTRUCTION DETAILS**

The Contractor shall provide, install, and maintain the various components of the two-way radio system in the locations designated by the Engineer. The Contractor shall make the system fully operational prior to the start of any contract work. Installation and maintenance of the two-way radio system shall be coordinated with the appropriate NYS DOT automation support personnel. All equipment furnished shall be subject to approval by the Engineer.

The Contractor shall be responsible for all modifications to the Engineer's field office, vehicle(s), and/or any other designated locations necessary to make it compatible with, and capable of supporting, the two-way radio system such as, but not limited to, the electrical system. These modifications shall be paid for under the Engineer's Office pay item or other appropriate pay item relating to the location of the modifications.

The system shall be maintained and remain in service until either: (a) the Engineer requests its removal in writing, (b) the State relinquishes the Engineer's field office and the two-way radio system is relinquished as part of the Engineer's field office, or (c) the later of either thirty (30) days after the final contract acceptance date or thirty (30) days after the date the Contractor provided the last documentation necessary for processing the final contract acceptance.

Ownership of the equipment and any transmission licenses supplied by the Contractor shall revert back to the Contractor upon completion of the contract.

All equipment and services furnished shall be subject to approval by the Engineer. The Contractor shall submit to the Engineer the details for the proposed two-way radio system to be provided. The details shall include the following information:

- Equipment/service provider - include contact information (customer service telephone number and website address if available)
- Available two-way radio systems including available transmission/equipment options

**ITEM 637.22 20 – TWO-WAY RADIO SYSTEM**

- The proposed system components to be provided (exact transmission/hardware options), including pictures of the equipment
- Contract details for transmission service/equipment (year commitment, etc.)
- Pricing information

Once the Engineer approves the proposed system, the two-way radio system shall be installed in a timely manner. At their discretion, the Engineer can require the Contractor to submit alternate system proposals.

As soon as the two-way radio system is installed, the Contractor shall supply qualified instruction to Department personnel and their authorized representatives, regarding the proper operation of the two-way radio system.

In a timely manner, the Contractor shall provide the Engineer with legible copies of the bills for the equipment and service(s) provided.

The two-way radio system shall be for the exclusive use of Department personnel and their authorized representatives.

The Contractor shall maintain all furnished equipment and services in good working condition and shall provide replacement, due to breakdown, damage, loss, or theft within 24 hours of notification.

**METHOD OF MEASUREMENT**

The two-way radio system will be measured on a fixed price Dollar Cents pay unit basis.

**BASIS OF PAYMENT**

The pay item is a 'draw down' item. As materials are supplied, the receipts for the materials shall be submitted to the Engineer. The Contractor will be reimbursed for receipted costs of materials plus 5% for profit and overhead ('materials' includes all physical materials, software, labor, services, and service contracts provided to furnish, install, maintain, and remove all of the components of the system).

The Contractor will be reimbursed for any receipted penalties incurred for breaking an Engineer-approved service contract with the service provider. If the length of the service contract extends excessively beyond the estimated completion of construction, the Contractor will only be reimbursed for penalties relating to the remainder of the service year in which the contract was terminated.

Unless a credit is provided by the service provider, the Contractor will be penalized for the number of days of non use of the equipment due to service interruption or malfunctioning of the system. The penalty will be based on the per-day cost derived from the bill.

No payment will be made for service during periods of contract extensions of time where engineering charges are assessed.

The total cost shown in the itemized proposal for this pay item will be considered the price bid even though payment will be made only for actual materials supplied. The unit price amount is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figure will be disregarded, and the original price will be used to determine the total amount bid for the contract.

**ITEM 637.3515 20 - DIGITAL CAMERA****DESCRIPTION**

This work shall consist of providing a fully operational digital camera system.

**MATERIALS**

The digital camera system shall include all the components specified in the contract proposal special note for this pay item. The system shall adhere to the technical specifications as specified in the contract proposal special note for this pay item.

The number of digital camera systems to be supplied shall be identified in the contract proposal special notes or by the Engineer.

The Contractor is required to provide maintenance service and repairs as necessary (A maintenance/extended warranty contract for the duration of the contract is reimbursable).

The components shall meet NYSDOT standards and requirements. Requests to provide more recent versions, revisions, or service pack applications of the software must be submitted in writing and approved by the Engineer prior to delivery.

The digital camera system shall be compatible with the computer systems to which it will be connected. The digital camera system shall include all necessary cables and hardware to provide a fully functional digital camera system and connect it to other computers systems to the satisfaction of the Engineer. All necessary software, operating manuals, and other pertinent media for all the components shall be provided. All equipment furnished shall be subject to approval by the Engineer.

**CONSTRUCTION DETAILS**

The Contractor shall provide, install, and maintain a digital camera system in a location designated by the Engineer. The Contractor shall make the system fully operational in a timely manner. All equipment furnished shall be subject to approval by the Engineer and the appropriate NYSDOT automation support personnel. The Engineer shall coordinate the review of the materials with the appropriate NYSDOT automation support personnel.

The system shall be maintained and remain in service until either: (a) the Engineer requests its removal in writing, (b) the State relinquishes the Engineer's field office and the digital camera system is relinquished as part of the Engineer's field office, or (c) the later of either thirty (30) days after the final contract acceptance date or thirty (30) days after the date the Contractor provided the last documentation necessary for processing the final contract acceptance.

Ownership of the equipment and software supplied by the Contractor shall revert back to the Contractor upon completion of the contract. The State may retain ownership of any data storage media, data storage containers, consumables, and other identified items.

The Contractor shall maintain all furnished equipment and software in good working condition and shall provide replacement due to breakdown, damage, or theft within two (2) working days.

Equipment more than one (1) year old shall not be provided. To verify the age of the equipment, the

**ITEM 637.3515 20 - DIGITAL CAMERA**

Contractor, upon request, shall provide the Engineer with a dated copy of the receipt(s) for the purchase of the equipment. Once equipment has been provided, it does not require replacement every year. However, during the life of the contract, the Engineer can require that new equipment be provided as needed.

**METHOD OF MEASUREMENT**

The digital camera will be measured on a fixed price Dollar Cents pay unit basis.

**BASIS OF PAYMENT**

The pay item is a 'draw down' item. As materials are supplied, the receipts for the materials shall be submitted to the Engineer. The Contractor will be reimbursed for receipted costs of materials plus 20% for profit and overhead ('materials' includes all physical materials, software, labor, services, and service contracts provided to furnish, install, maintain, and remove all of the components of the system).

The total cost shown in the itemized proposal for this pay item will be considered the price bid even though payment will be made only for actual materials supplied, with profit and overhead. The unit price amount is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figure will be disregarded, and the original price will be used to determine the total amount bid for the contract.

If new equipment is not provided, the Engineer shall determine a reasonable cost for the equipment. The Contractor should provide a copy of the original receipt for the equipment to assist the Engineer in assessing the current value of the equipment. Used equipment less than one (1) year old shall be assessed at no more than fifty percent (50%) of the original receipted cost. Equipment over one (1) year old should not be considered for approval.

**ITEM 637.3516 20 – OFFICE TECHNOLOGY SUPPLIES****Description**

This work shall consist of providing office technology supplies for the Engineer's field office for the duration of the construction contract.

**Materials**

The Contractor shall provide the requested office technology supplies (storage media, paper, printer toner cartridges, connection cables, software, etc.).

As applicable, the office technology supplies shall meet NYSDOT standards and requirements, be 100% compatible with the computer system, and function in the operating system environment installed on the computer. All materials furnished shall be subject to approval by the Engineer with input provided from the appropriate NYSDOT automation support personnel.

**Construction Details**

Upon the setup of the Engineer's Office, office technology supplies, as identified in the technical specifications special note relating to this pay item in the contract proposal, shall be provided.

In addition, for the duration of the construction contract, the Contractor shall provide office technology supplies upon the request of the Engineer to support the Engineer's field office technology needs.

Supplies shall be provided within two (2) days of the Engineer's request, unless the Engineer agrees to a longer delivery time.

The Department shall retain ownership of all office technology supplies.

**Method of Measurement**

The pay item will be measured on a fixed price Dollar Cents pay unit basis.

**Basis of Payment**

The pay item is a 'draw down' item. As materials are supplied, the receipts for the materials shall be submitted to the Engineer. The Contractor will be reimbursed for receipted costs of materials plus 20% for profit and overhead ('materials' includes all physical materials, software, labor, services, and service contracts provided).

The total cost shown in the itemized proposal for this pay item will be considered the price bid even though payment will be made only for actual materials supplied, with profit and overhead. The unit price amount is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figure will be disregarded, and the original price will be used to determine the total amount bid for the contract.

### ITEM 637.3551 20 - CPM SCHEDULING

#### DESCRIPTION

The work shall consist of furnishing and maintaining a computerized CPM (Critical Path Method) Scheduling System. The requirements of Section 108-01, shall apply except where superceded by this specification.

The purpose of the computerized CPM Scheduling System is to ensure timely completion of the contract and to establish a standard methodology for time adjustment analysis based on the principles of the Critical Path Method of Scheduling. The CPM schedule shall be prepared based on the principles defined by the latest issue of the *Construction Planning & Scheduling Manual* published by the Associated General Contractors of America.

#### MATERIALS

The Contractor shall furnish the Engineer with a licensed copy of the latest available version of Primavera SureTrak Project Manager.

The Contractor shall ensure that any and all computer files submitted to the Engineer are in a format that can be imported directly into SureTrak Project Manager.

#### CONSTRUCTION DETAILS

##### A. PRE CONSTRUCTION SCHEDULING MEETING

The Engineer will schedule and conduct a Pre construction Scheduling Meeting with the Contractor within fifteen (15) calendar days after the contract has been awarded. The requirements of this specification will be reviewed at this meeting. Additionally the following topics will be discussed:

- Specifics of any contract Time-Related Clauses (A+B, I/D, Liquidated Damage, etc.).
- The representation in the schedule of the Time Related work.
- The calendar, activity coding, and resource definition requirements unique to and consistent with the contract.
- The Contractor's schedule methodology employed, proposed work sequence and any proposed deviations from the contract plans.
- The factors that the Contractor determines to control the completion of the project and any milestone completions contained therein.
- Narrative content for Initial Baseline and Monthly Updates.
- Schedule submission protocol for Initial Baseline and Monthly Updates.

The Contractors attendance at the Pre construction Scheduling Meeting is mandatory. No field work will be allowed, with the exception of set up of the Engineer's field office, until this meeting is held.

##### B. INITIAL BASELINE CPM CONSTRUCTION SCHEDULE

Within thirty (30) calendar days following the Pre-Construction Scheduling Meeting, the Contractor shall prepare and submit to the Engineer the Initial Baseline CPM Construction Schedule for the entire project. This submission shall include the electronic Schedule file and paper reports as listed in paragraph B - 2 below.

**ITEM 637.3551 20 - CPM SCHEDULING**

The Initial Baseline Schedule shall represent the Contractor's plan to construct the project. This schedule shall include all work and activities necessary to complete the project including but not limited to activities for the preparation, submittal, review, approval, fabrication, and delivery of all shop drawing and procurement related items. The Initial Baseline CPM Construction Schedule must be set up to conform with the staging/phasing and other requirements defined in the contract.

The Initial Baseline Schedule shall meet all interim milestone dates and shall not extend beyond the contract completion date.

**1. SCHEDULE REQUIREMENTS**

The Contractors Initial Baseline CPM Construction Schedule shall meet the following requirements:

**a. CPM ACTIVITY NETWORK FORMAT**

The schedule network shall use the Precedence Diagramming Method.

**b. PROJECT DEFINITIONS** The following project specific properties within the schedule shall be defined:

**CALENDAR-** The standard calendar shall be 8-hour days, five days per week and shall account for holidays and non working days. Additional calendars shall be created and included as required for:

- Work week (5 or 6 day).
- Seasonal restrictions (asphalt, landscape, etc.).
- Concrete curing/calendar days.
- Shop drawing review (consistent with NYSDOT work calendar).
- Any project specifics as required by the Engineer.
- Expected and contemplated weather conditions shall be accounted for in the calendars.

All calendars created shall encompass and account for the total duration of the contract time period.

**ACTIVITY CODE-** As a minimum the following activity codes shall be established:

- **Responsibility** - The party responsible for each activity. Only one party can be responsible for an activity. Include Values for "NYSDOT", "Prime Contractor" and third parties to the contract as appropriate (utilities, etc).
- **Phase-** Phasing consistent with Contract plans where each activity is performed; Include Values for "None", and "Project Wide".
- **Stage** - Staging consistent Contract MPT stage where each activity is performed; Include Values for "None", and "Project Wide".
- **Location** - Location of activity work by Stationing, Ramp #, Structure #, etc.; Include Value for "None", and "Project Wide".
- **Type-** The type of work for each activity; Include a Value for

**ITEM 637.3551 20 - CPM SCHEDULING**

”Administrative”

- **Added Work-** Work added to the Contract and incorporated into the schedule with the Engineers Approval; Include a Value for “None”
- **Time Related Clause-** A+B, I/D, Liquidated Damages, etc.; Include a Value for “None”.
- **As Required by Project -** Any coding unique to or as required by the Engineer to facilitate the use and analysis of the Schedule. This coding shall be established in consultation with the Engineer at the Pre construction Scheduling Meeting.

RESOURCES - The Resource Dictionary shall be established as required by the Engineer. The Resource Dictionary shall be limited to Labor and Equipment. Labor may be represented by work crews. The composition of each crew must be detailed and included as an appendix to the Narrative Report. Sub Contractors shall be represented as a labor crew(s).

c. **ACTIVITIES DATA**

**ACTIVITY IDENTIFICATION** - Each activity shall have a unique identifier. The identifier may be alpha-numeric, but at a minimum must be a unique number.

**ACTIVITY DESCRIPTION** - Each activity shall be unambiguously described. Descriptions such as "construct 30% of ...", are unacceptable. Activities shall be discrete to the extent necessary to accurately schedule the work.

**ACTIVITY DURATION** - Durations of individual work activities shall not exceed fifteen working days. The minimum activity duration increment is one full day. Durations of individual shop drawing review activities may exceed fifteen working days and shall be consistent with Contract Requirements. Exceptions to this will be reviewed by the Engineer on an activity-by-activity basis. If requested by the Engineer, production rates or other supporting information shall be supplied justifying the reasonableness of any given activity time duration. A Method Statement including the labor, equipment, production rates and any additional information, required to achieve a given activity shall be supplied when requested by the Engineer.

**ACTIVITY RELATIONSHIPS** – Activity relationships shall be finish-to-start with no lags unless directed otherwise by the Engineer. Contractor requests for exemptions will be made on a case by case basis. Each activity with the exception of the required “Project Award” and “Completion” activities shall have a predecessor and a successor activity relationship.

**ACTIVITY START and FINISH DATES** - The earliest start date, earliest finish date, latest start date, and latest finish date shall be calculated for each activity.

**ACTIVITY TOTAL FLOAT** - The total float shall be calculated for each activity. Total float is the full amount of time by which the start on an activity may be

**ITEM 637.3551 20 - CPM SCHEDULING**

delayed without causing the project to last longer.

ACTIVITY CALENDARS- The appropriate calendar assignment shall be made to each activity.

ACTIVITY CODES - Coding shall be assigned to each activity from the defined activity dictionary. Each code shall have a value assigned in a given activity.

ACTIVITY CONSTRAINTS - The start or completion of any activity shall not be constrained. Exceptions to this must be approved by the Engineer. A "Must-Finish-By" Date for the overall project is a constraint and must be approved.

ACTIVITY RESOURCES- The schedule shall be "Resource" loaded as required by the Engineer. The resources required to accomplish each activity shall be assigned to that activity from the 'Resource Dictionary'.

d. **REQUIRED ACTIVITIES**

The following activities shall be incorporated into the Schedule:

<u>Activity ID</u>	<u>Activity Description</u>	<u>Activity Type</u>	<u>Logic Relationship</u>
000010	Contract Award	Start Milestone	No Predecessors to this First Schedule Activity
999999	Completion	Finish Milestone	No Successors to this Last Schedule Activity

e. **DATA DATE**

The Data Date and Project Start Date in the Initial Baseline Schedule shall be the AWARD DATE.

The Data Date for each Monthly Update shall be the last work day of the month.

2. **REVIEW OF THE INITIAL BASELINE CPM CONSTRUCTION SCHEDULE**

The Contractor shall submit to the Engineer the following items to facilitate review of the Initial Baseline CPM Construction Schedule:

- Narrative- A statement explaining the general sequence of work in the Contractor's schedule, a detailed definition of the work on the Critical Path, a statement regarding the meeting of any Time Restrictive Clause dates and bonus dates, and the explanation of any other ambiguities in the schedule.

The following Activity Sorts generated from the software shall be provided:

- Critical Path Activity Sort - The activities that comprise the projects Critical Path. The list shall start with the first activity in the path and then ascend by Early Start date to the final activity in the path.
- Time Related Activity Sort - For contracts that contain Interim Time Frames (A+B, I/D, etc.), the activities necessary to complete the work within each specific Time Frame provision in the contract, shall be listed. The list shall start

**ITEM 637.3551 20 - CPM SCHEDULING**

with the first milestone activity and then ascend by Early Start date to the final milestone activity in the network comprising each Time Frame period. Include a Critical Path activity sort for each specific Time Frame in the contract.

- Constraint Activity Sort - Listing of Constrained Activities and type of constraint.
- Listing of Calendars and Activity Coding incorporated in the Schedule

Electronic copies of the Initial CPM Construction Schedule shall be provided.

The Engineer will review the Initial Baseline CPM Construction Schedule and forward any comments, revisions, or requests to the Contractor. Within fifteen (15) calendar days of the Engineer's reply, the Contractor shall make adjustment to the Initial Baseline CPM Construction Schedule in accordance with the Engineer's comments and resubmit copies for review consistent with the above directives.

Upon final revisions, the Contractor shall submit electronic file copies of the Initial Baseline CPM Construction Schedule to the Engineer. A sort of activities scheduled to start (ES) & finish (EF) in the next update period shall be included. The Logic Diagram (PERT chart) shall be submitted on 279 mm x 425 mm size sheets. The final submission shall be submitted for approval within one week of the Contractor's receipt of the final comments by the Engineer.

Approval of the Initial Baseline CPM Construction Schedule by the Engineer shall not be construed to imply approval of any particular method or sequence of construction or to relieve the Contractor of providing sufficient materials, equipment, and labor to guarantee completion of the project in accordance with the contract proposal, plans, and specifications. Approval shall not be construed to modify or amend the completion date. Completion dates can only be modified or amended by standard contractual means.

Failure to include in the Initial Baseline CPM Construction Schedule any element of work required for the performance of the contract shall not excuse the Contractor from completing all work required within the completion date(s) specified in the contract.

**C. SCHEDULE UPDATES****1. MONTHLY PROGRESS UPDATES**

The Contractor shall update the schedule monthly. The schedule shall be updated to include all work and progress up to and including the last working day of the month. This will establish the "Data Date". The Monthly update shall detail progress based on actual dates of activities started and completed, the percent of work completed to date on each activity started but not yet completed and the status of procurement of critical materials. The updated schedule data shall be submitted in an electronic file format acceptable to the Engineer.

A Narrative Report is required for each update and shall provide the following

information:

- Contractors transmittal letter to the EIC stating the update period and schedule "Data Date".
- Work started, completed and ongoing during the update period by activity with "Actual Dates".
- Description of current Critical Path and any change from previous Critical Path.
- Any activities added or deleted and any proposed changes in Activity Logic (Engineer's approval is required).
- Current Delays or Advancements
  - Delayed or Advanced Activities.
  - Proposed corrective action and schedule adjustments to address the Delay.
  - Impact of Delay or Advancement on other activities(duration, ES,EF,LS,LF), milestone and completion dates.
  - Impact of Delay or Advancement on the Critical Path.
- Outstanding Items that effect the schedule and status thereof (including but not limited to):
  - Permits.
  - Shop Drawings.
  - Orders-on-contract.
  - Reviews of submittals.
  - Approvals.
  - Fabrication and Delivery.
- Scheduled Completion Date Status
  - Contract Completion.
  - Interim Time Frame (A+B, I/D, etc.).

The following Activity Sorts generated from the Software shall be provided:

- Current Critical Path Activity Sort.
- Near Critical Activities Sort, TF< 5 days.
- Sort of Activities scheduled to start (ES) & finish (EF) in the next Monthly update period.

The Monthly Progress Updates shall be submitted to the Engineer within three (3) calendar days of the "Data Date". The Engineer shall prepare a written response within seven (7) calendar days of receipt of the Monthly Update approving, approving with comments, or returning for resubmission. If the Contractor fails to comply with the Monthly Progress Update submission requirements the Engineer may invoke Article 8 of the contract and withhold contract payments.

#### **D. TOTAL FLOAT OWNERSHIP**

Total Float belongs to the contract and shall not be considered as available for the exclusive use of or benefit of either the State or the Contractor. Total Float is the number of days an activity may be delayed without extending the completion of either the project or an interim milestone. Float is available on a first-come, first-served basis to all identified "Responsible" parties in the schedule.

**ITEM 637.3551 20 - CPM SCHEDULING****E. FLOAT MANIPULATION NOT PERMITTED**

The Schedule shall not sequester float through such strategies as calendar manipulation, resource/labor manipulation or the extension of activity durations to fill up available float time. The Initial Baseline CPM Construction Schedule shall not attribute negative float to any activity.

**F. CHANGES TO THE SCHEDULE**

The Initial Baseline CPM Construction Schedule shall accurately reflect the manner in which the Contractor intends to proceed with the project. Changes to the schedule (the addition or deletion of activities, logic changes, and duration changes) shall be submitted in writing to the Engineer for approval and inclusion in the next Monthly Progress Update. The approved or approved with comments Monthly Progress Update shall be considered the updated Baseline from which future progress is measured. The process of comparing the Schedule Update to Baseline (previous Update) shall be followed throughout the contract. Revision to any contract milestones, or contractually mandated schedule provisions will not be permitted without written authorization from the Engineer.

**G. CRITICAL ACTIVITIES AND BASIS FOR TIME ADJUSTMENTS**

The measure for Time Adjustments in the schedule shall be based on the criticality of the delay or advancement. Criticality is defined as the presence of the delayed or advanced activity on the projects Critical Path. The Critical Path is defined to be the longest continuous chain of activities through the schedule network that establishes the minimum overall duration in the absence of constraints in the program software.

**H. CHANGES TO THE CONTRACT**

In the event a notice of a change to the contract is received the Contractor shall notify the Engineer in writing within 10 (ten) calendar days of the effect of such change to the schedule. Change to the contract includes, but is not limited to, extra work, Orders on Contract's, suspensions, changed condition, Value Engineering Change Proposal, etc. The effect of the change to the contract on the projects Critical Path shall be stated. Any proposed revisions to the Schedule to incorporate the change to the contract shall be stated. No changes shall be made to the Schedule without the written approval of the Engineer. The approved changes shall be incorporated in the next Monthly Progress Update.

**I. SCHEDULE ANALYSIS METHOD**

Events, actions, and progress that cause delays or gains to the Project Schedule will be analyzed solely by the "Contemporaneous Period Analysis" method. The Contemporaneous Period Analysis evaluates delays or gains in the period in which it occurred. The analysis period for the purpose of this Specification shall be the period covered in each Monthly update to the schedule.

**METHOD OF MEASUREMENT**

The Critical Path Method Scheduling System will be measured for payment on a Lump Sum

**ITEM 637.3551 20 - CPM SCHEDULING**

Basis.

**BASIS OF PAYMENT**

The lump sum price bid for the Critical Path Method Scheduling system shall include the cost of preparation and submission of the Initial Baseline Schedule and the preparation and submission of the monthly updates and the licensed copy of the latest available version of SureTrak Project Manager.

Payment will be made as follows:

- A. Upon completion of the Pre-Construction Schedule Meeting 10%
- B. Upon acceptance of the Initial Baseline Construction Schedule 30%
- C. The balance will be paid in equal monthly payments distributed over the contract. These payments will be contingent on the submission of acceptable monthly updates. 60%

**ITEM 15637.98 M - PARTNERING WORKSHOP**

**DESCRIPTION.** Standard Specification Section 103-02A - PARTNERING, contains the Department's policy to implement partnering concepts and principles on construction contracts. Project partnering will be categorized as "formal" and "informal" partnering. This item relates to formal partnering only.

The Department is offering to progress this contract with formal partnering. Should the Contractor voluntarily accept the Department's offer and agree to partner this contract, then this item will be utilized.

Under this item, the Contractor will provide the services of an independent Facilitator to coordinate and facilitate an initial partnering workshop for this contract. In the spirit of partnership, the State and the Contractor will equally share the cost of the partnering workshop. The Contractor is responsible for initially paying the entire cost of the Facilitator and the associated workshop costs. The intent of this item is to reimburse the Contractor 50 percent of those costs.

**MATERIALS.** None Specified.

**CONSTRUCTION DETAILS.** The Contractor and the Regional Construction Engineer will jointly select a Facilitator and a location for the workshop. A list of potential Facilitators is available from the Department. The Facilitator shall present a 1 to 2 day Partnering Workshop for this project between the time of award and the start of the project. For long duration, multi year projects, a subsequent follow-up workshop may be convened, with the agreement of the Contractor and the Regional Construction Engineer, at an appropriate point during the progression of the project. The associated costs for this subsequent workshop will be reimbursed under this item.

**METHOD OF MEASUREMENT.** Payment for costs incurred will be computed by Force Account for 50 percent of the actual and reasonable receipted costs of completing this item in accordance with Section 109-05 of the Standard Specifications. Receipted costs eligible for 50% reimbursement under this item shall include the fee for the Facilitator and the costs for the Facilitator's travel and expenses; associated workshop costs, such as charges for the rental of the meeting room, required audio/visual equipment, and any handouts, notes or workshop materials.

The costs for travel, lodging, meals and salaries of workshop attendees, other than those of the facilitator, will not be eligible for full or partial reimbursement under this item.

**BASIS OF PAYMENT.** The fixed price lump sum shown in the itemized proposal for this work will be considered the price bid even though payment will be made only for 50 percent of the actual cost of the Facilitator and associated workshop costs.

The fixed price lump sum for this item is believed to be sufficiently large enough to include 50 % of the eligible receipted partnering workshop costs. Should the amount of the fixed price lump sum not be sufficient, the State will supplement it as necessary through the order-on-contract process as approved by the Engineer.

The fixed price lump sum figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figure will be disregarded, and the original price will be used to determine the total amount bid for the contract.

**ITEM 10644.01 M - PAINTING BACK OF NEW ALUMINUM SIGN PANELS (9A)**  
**ITEM 10644.02 M - PAINTING OF NEW SIGN POSTS FOR GROUND MOUNTED SIGNS (9A)**

**DESCRIPTION**

This work shall consist of painting new sign panels and sign posts at the locations indicated on the plans or where directed by the Engineer. All painting work, except field touch-up and bolt painting, shall be done in the shop. The two coat paint system shall consist of an epoxy primer coat and a urethane finish coat.

**MATERIALS**

Paint and thinner shall be selected from the Department's Approved List, "PAINTS FOR STRUCTURAL STEEL, A. Primer Paint and Thinners and C. Finish Paint and Thinners." No substitutions will be allowed.

All primer and finish coats of paint used on this contract shall be produced by the same manufacturer.

Each paint (primer and finish coat) shall be a different color. The color of the primer will be the Contractor's option. However, it shall contrast with the underlying substrate. The primer coat color shall be such that it can be completely hidden by a single coat of finish paint applied at the minimum specified dry film thickness.

Finish coat color shall be the standard Route 9A color noted in the contract plans. Viewing shall be done under North Standard Daylight

**Basis of Acceptance**

Acceptance of paint and thinner material will be based on the appearance of the manufacturer's name, and the product name, on the Department's Approved List.

Only paint and thinner furnished in new, unopened containers shall be used.

Containers of paint shall be labeled with the manufacturer's name, product name, component part, batch number, date of manufacture and shelf life date. Paint in containers having expired shelf life dates shall be immediately removed and not used.

Containers of thinner shall be labeled with the manufacturer's name and the product name. If an approved generic thinner is supplied it shall be clearly identified as reagent grade.

ITEM 10644.01 M - PAINTING BACK OF NEW ALUMINUM SIGN PANELS (9A)  
ITEM 10644.02 M - PAINTING OF NEW SIGN POSTS FOR GROUND MOUNTED  
SIGNS (9A)

CONSTRUCTION DETAILS

The following surfaces shall be prepared and shop painted with an epoxy primer coat and a urethane finish coat:

- A. Aluminum Sign Panels - The back face of the panel and all hardware, brackets, stringers, and Z bars of overhead panels and ground mounted guide and traffic signs;
- B. Sign Posts - The posts, slip impact base and hinge assemblies, and all hardware of ground mounted guide and traffic signs except that facing surfaces shall not be painted;

Manufacturer's Instructions - At least 5 working days prior to the start of work, the Contractor shall provide the Engineer with one copy of the paint manufacturer's current technical data sheets for the paint furnished. Instructions, suggestions and precautions contained in the data sheets shall be followed to the extent that they do not contradict the provisions of this specification.

Atmospheric Conditions - No surface preparation (cleaning) or paint application shall be performed unless all the following conditions are met:

1. The receiving surface shall be clean and dry.
2. The receiving surface temperature and ambient air temperature shall be as recommended by the paint manufacturer, except that in no case shall cleaning or painting work be performed when surface and ambient temperatures are less than 5 °C or greater than 38 °C.
3. The paint material temperature shall be as recommended by the paint manufacturer, except that in no case shall paint be applied when the paint material temperature is less than 5 °C.
4. The receiving temperature shall be at least 3 °C above the dew point.
5. The relative humidity shall be less than 85%.

Preparation and Painting of Steel Surfaces - All materials used in the preparation and painting of galvanized and non-galvanized components shall be as specified in the special note "Preparation and Painting of Steel Surfaces" found elsewhere in the proposal. The color of the topcoat shall be

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**ITEM 10644.01 M - PAINTING BACK OF NEW ALUMINUM SIGN PANELS (9A)**  
**ITEM 10644.02 M - PAINTING OF NEW SIGN POSTS FOR GROUND MOUNTED SIGNS (9A)**

such that a properly prepared color chip shall be a reasonable visual match to the standard Route 9A color noted in the contract plans. Viewing shall be done under North Standard Daylight.

Preparation and Painting of Aluminum Surfaces - All materials used in the preparation and painting of aluminum components shall be as specified in the special note "Preparation and Painting of Aluminum Surfaces" found elsewhere in the proposal. The color of the topcoat shall be such that a properly prepared color chip shall be a reasonable visual match to the standard Route 9A color noted in the contract plans. Viewing shall be done under North Standard Daylight.

Handling - Handling, shipping and erection of coated members shall not be performed until the paint is thoroughly dry. All members shall be handled, loaded for shipment, delivered and installed in such a manner as to avoid abrading the coatings. Wood blocks and nylon slings are recommended for securing, loading, hoisting or storing members. Steel chains and slings shall not be directly attached to the coated members.

Touch-up - After erection, all areas where paint has become damaged or deteriorated shall be thoroughly cleaned and "touched-up" or repainted with the appropriate number of coats as directed by and to the satisfaction of the Engineer. Exposed surfaces of attachment hardware such as bolts, nuts, and washers shall be prepared and painted with a primer and finish coat all in accordance with the requirements specified above for shop applied paint except that paint application shall be brush only.

**METHOD OF MEASUREMENT**

- A. Sign Panels - Painting the back of sign panels will be measured as the number of square meters of sign panel painted in accordance with this specification. The area will be computed to the 0.01 square meter with no reduction for rounded corners.
- B. Sign Posts - This work will be measured as the number of sign assemblies for which the sign posts are painted in accordance with this specification. A sign assembly will be counted as one, regardless of the number of sign panels or the number of sign posts in the assembly.

**BASIS OF PAYMENT**

The unit price bid for each item shall include the cost of all labor, materials, and equipment necessary to complete the work.

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**ITEM 10644.1002 M - PAINTING OF NEW SINGLE CANTILEVER SIGN  
STRUCTURE**

**ITEM 10644.1102 M - PAINTING OF NEW DOUBLE CANTILEVER SIGN  
STRUCTURE**

**ITEM 10644.1202 M - PAINTING OF NEW SINGLE SPAN SIGN STRUCTURE**

**ITEM 10644.1302 M - PAINTING OF NEW SINGLE SPAN AND CANTILEVER SIGN  
STRUCTURE**

**ITEM 10644.1402 M - PAINTING OF NEW MULTI-SPAN SIGN STRUCTURE**

**ITEM 10644.1502 M - PAINTING BACK OF NEW ALUMINUM SIGN PANELS**

**ITEM 10644.1602 M - PAINTING OF NEW SIGN POSTS FOR GROUND MOUNTED  
SIGNS**

**ITEM 10644.1702 M - PAINTING OF NEW SIGN LIGHTING LUMINAIRES AND  
SUPPORTS**

**ITEM 10644.1802 M - PAINTING OF NEW TRAFFIC SIGNAL POLES**

**DESCRIPTION:**

This work shall consist of painting new sign structures, sign panels, sign posts, sign lighting luminaires and supports, and traffic signal poles at the locations indicated on the plans or where directed by the Engineer. All painting work, except field touch-up and hardware painting, shall be done in the shop. For purposes of this specification, a shop is defined as an enclosed facility. All surfaces shall be painted with a two coat paint system (primer coat and urethane finish coat)

**MATERIALS:**

Paint and thinner shall be selected from the Department's Approved List, "Moisture-Curing Urethane Paint Systems". No substitutions will be allowed.

All primer and finish coats of paint used on this contract shall be produced by the same manufacturer.

Each paint (primer and finish coat) shall be a different color. The color of the primer will be the Contractor's option. However, it shall contrast with the underlying substrate. The primer coat color shall be such that it can be completely hidden by a single coat of finish paint applied at the minimum specified dry film thickness.

The finish coat color shall be as specified in the Contract Documents. The Contractor shall provide two 75 mm by 150 mm samples of the factory applied coatings and colors that are proposed for use in the project to the Engineer for approval prior to full production of the coating application.

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**ITEM 10644.1002 M - 10644.1802 M (CONTINUED)**  
**BASIS OF ACCEPTANCE**

Acceptance of paint and thinner material will be based on the appearance of the manufacturer's name and the product name on the Department's Approved List.

Only paint and thinner furnished in new, unopened containers shall be used.

Containers of paint shall be labeled with the manufacturer's name, product name, batch number, date of manufacture. Paint that has not been used within 12 months from the date of manufacture shall immediately be removed from the work site.

Containers of thinner shall be labeled with the manufacturer's name and the product name. If an approved generic thinner is supplied, it shall be clearly identified as reagent grade.

**CONSTRUCTION DETAILS:**

The following surfaces shall be prepared and painted in the shop except for field touch up and attachment hardware painting which can be done after erection in the field:

Sign Structures - All exterior surfaces of the sign structure including dampener; except that faying surfaces shall not be painted;

Aluminum Sign Panels - The back face of the panel and all hardware, brackets, stringers, and Z bars of overhead panels and ground mounted guide and traffic signs;

Sign Posts - The posts, slip impact base and hinge assemblies, and all hardware of ground mounted guide signs, except that faying surfaces shall not be painted.

Sign Lighting Luminaires and Supports - All exterior metal surfaces of the luminaires and all metal members and hardware of the support arms and brackets.

**Manufacturers instructions:**

At least five working days prior to the start of work the Contractor shall provide the Engineer with one copy of the paint manufacturer's current technical data sheets for the paint furnished. Instructions, suggestions and precautions contained in the data sheets shall be followed to the extent that they do not contradict the provisions of this specification.

**Material Storage:** Paint in storage shall be protected from damage and maintained between 5°C and 30° C.

**ITEM 10644.1002 M - 10644.1802 M (CONTINUED)**

**Specifications and Inspection Equipment:** Prior to the start of and throughout the duration of work the contractor shall supply the Engineer with the following specifications and equipment. *No work shall begin until these materials have been delivered to, and accepted by the Engineer.*

- a. One bound copy of the Steel Structures Painting Council method SSPC-PA2, Paint Application Specification No. 2 - Measurement of Dry Film Thickness With Magnetic Gauges.
- b. One Air Thermometer, pocket type, -10°C to +40°C.
- c. One Surface Thermometer, pocket type, -10°C to +40°C.
- d. One Magnetic Dry Film Thickness Gauge, Type 2 (fixed probe), with a digital readout display capable of measuring 0  $\mu\text{m}$  to 1500  $\mu\text{m}$  in 1  $\mu\text{m}$  increments.
- e. Two Wet Thickness Gages, Prong Type, capable of measuring 25  $\mu\text{m}$  to 125  $\mu\text{m}$  in 25  $\mu\text{m}$  increments.
- f. Four pocket size, "horseshoe" style magnets.
- g. One bound copy of the Steel Structures Painting Council publication Number 91-08, Surface Preparation Specifications.

**Atmospheric conditions:** No surface preparation (cleaning) or paint application shall be performed unless all the following conditions are met:

- a. The receiving surface shall be clean and absolutely dry.
- b. The receiving surface temperature and ambient air temperature shall be as recommended by the paint manufacturer, except that in no case shall cleaning or painting work be performed when surface and ambient temperatures are less than 2° C or greater than 38° C. There will be no restriction for humidity or for dew point-temperature differential.
- c. The paint material temperature shall be as recommended by the paint manufacturer, except that in no case shall paint be applied when the paint material temperature is less than 5° C.

**Preparation and pretreatment of galvanized surfaces:**

Prior to painting, galvanized surfaces shall be treated in accordance with Subsection 740-03 of the Standard Specifications except with the following addition:

After "Solvent Cleaning" but before "Wash-Coat", the galvanized surface shall be abraded by brush blast methods or other mechanical means approved by the Engineer. The purpose of the abrading is to roughen the surface, not to remove a significant amount of galvanizing.

**ITEM 10644.1002 M - 10644.1802 M (CONTINUED)****Preparation of aluminum surfaces:**

Aluminum surfaces shall be cleaned in accordance with Subsection 740-01 under Surface Preparation B, Solvent Cleaning. Following cleaning, the aluminum surfaces shall be slightly roughened by blasting lightly with fine sand. Those portions of aluminum or aluminum alloy surfaces that will be in contact with cast or pneumatically projected concrete shall be painted in accordance with Subsection 740-04 Painting Aluminum Surfaces.

**PAINTING:**

Paint shall be proportioned and thoroughly mixed with mechanical mixers in accordance with the paint manufacturer's recommendations. After mixing the bottom of the container shall have no unmixed pigment.

Thinning of paint will be allowed if recommended by the manufacturer and only if approved by the Engineer. Only approved thinner shall be used and added up to a maximum of 60 ml/L. Thinning shall be performed by pouring one-half of the thoroughly mixed paint into a empty, clean container. The required thinner is then added to one of the half-sized portions, and the two portions are remixed to obtain a homogenous mixture.

The paints specified for this work have a limited pot life because of their reaction with the moisture in the atmosphere. The paint will gel when it nears the end of it's pot life. Thinning to reduce the viscosity of the gelled paint will not be allowed. The pot life of the paint can be extended by covering open containers to reduce exposure to moisture, and by keeping containers of paint cool.

No painting shall begin until the surfaces have been inspected and approved by the Engineer. Paint may be applied by brush, roller or airless spray methods unless otherwise recommended by the paint manufacturer. The requirements and restrictions of Standard Specification Subsection 740-01 Paint Application Methods apply. All paint shall be applied so as to produce a uniform, even coating free from runs, sags, drips, ridges or other defects.

No coat of paint shall be applied until the previous coat has cured in accordance with the manufacturer's instructions and has been approved by the Engineer.

Paint film thickness shall be applied in such a quantity so as to produce the minimum specified dry film thickness for the type of paint material being used (see Approved List - Moisture-Curing Urethane Paint Systems).

The dry film thickness shall be determined in accordance with SSPC-PA2, Paint Application Specification No. 2 "Measurement of Dry Paint Thickness with Magnetic Gages." Dry film thickness shall be measured by fixed probe magnetic gages.

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**ITEM 10644.1002 M - 10644.1802 M (CONTINUED)**

Areas failing to meet the specified minimum dry film thickness shall be overcoated with the same

type of paint to produce at least the total dry film thickness required. Paint applied containing unauthorized thinners, paint applied to contaminated surfaces and paint applied contrary to this specification shall result in recleaning and repainting the surface. The work of recleaning, repainting or overcoating, if required shall be done by the Contractor to the satisfaction of the Engineer at no additional cost to the State.

All coats of paint shall be overcoated with the subsequent coat in accordance with the time period specified for the paint material that is being used ( see Approved List - Moisture-Curing Urethane Paint Systems). To prevent intercoat adhesion failure, recoating with the next coat must be performed within the maximum specified time period, or 14 days, whichever is shorter. If the contractor fails to recoat within the specified time period the surface to be painted shall be lightly abraded, using power sanders, prior to applying the next coat of paint. The purpose of power sanding will be to improve adhesion by lightly roughening the surface of the existing paint, not to remove it.

**Handling:**

Handling, shipping and erection of coated members shall not be performed until the paint is thoroughly dry. All members shall be handled, loaded for shipment, delivered and installed in such a manner as to avoid abrading the coatings. Wood blocks and nylon slings are recommended for securing, loading, hoisting or storing members. Steel chains and slings shall not be directly attached to the coated members.

**Attachment Hardware Painting:**

After erection, exposed surfaces of attachment hardware such as bolts, nuts, and washers shall be painted in the field in accordance with the requirements specified above for shop applied paint except that paint application shall be by brush only.

**Touch-up:**

After erection, all areas where paint has become damaged or deteriorated shall be thoroughly cleaned and "touched-up" or repainted with the appropriate number of coats as directed by and to the satisfaction of the Engineer.

**METHOD OF MEASUREMENT:**

Sign Structures - This work will be measured as the number of sign structures painted in accordance with this specification.

Sign Panels - Painting the back of sign panels will be measured as the number of square meters of sign

**ITEM 10644.1002 M - 10644.1802 M (CONTINUED)**

panel painted in accordance with this specification. The area will be computed to the nearest 0.01 square meter with no reduction for rounded corners.

Sign Posts - This work will be measured as the number of sign assemblies for which the sign posts are painted in accordance with this specification. A sign assembly will be counted as one, regardless of the number of sign panels or the number of sign posts in the assembly.

Sign Lighting Luminaires and Supports - This work will be measured as the number of sign lighting luminaires complete with supports painted in accordance with this specification.

Traffic Signal Poles - This work will be measured as the number of traffic signal poles, including mast arms if used, painted in accordance with this specification.

**BASIS OF PAYMENT:**

The unit price bid for each item shall include the cost of all labor, materials, and equipment necessary to complete the work.

**ITEM 11645.30 M - EMBEDDED TRAFFIC AND STREET NAME SIGN POST WITH FINIAL****DESCRIPTION**

Under this item, the Contractor shall furnish and erect embedded traffic and street name sign posts with finials where indicated on the plans or ordered by the Engineer.

**MATERIALS**

All posts shall be galvanized steel pipe in accordance with ASTM F1083, Schedule 40, in size shown on Drawings.

Finials, Slip Over Ease and sign mounting brackets shall be cast ductile iron in accordance with ASTM A536, Grade 65-45-12.

Aluminum for sign stiffeners shall be in accordance with ASTM B209, 6061-T6 alloy and temper.

Bolts, nuts, washers and like items shall conform to the requirements of Subsections 715-14 and 715-16 of the New York State Department of Transportation Standard Specifications (Metric Edition).

**CONSTRUCTION DETAILS**

The posts shall be shop painted in accordance with the specifications for Painting of Sign Posts for Ground Mounted Signs.

The posts shall be set in pre-augered holes as shown on the Contract drawing or as directed by the Engineer. After the posts have been set-in-place and properly supported to hold them to line and grade, the remaining space shall be filled with a grout consisting of one (1) part of cement to two (2) parts sand.

**METHOD OF MEASUREMENT**

The work shall be measured by the actual number of sign posts, installed in accordance with the contract documents or as directed by the Engineer.

**BASIS OF PAYMENT**

The unit price bid for this item shall include the furnishing of all labor, materials, tools, equipment, finials, bases, sign mounting brackets, U-bolts, nuts, bolts and screws, installed in place to complete the work in accordance with the plans, this specification or as directed by the Engineer. Painting shall be paid for under the Painting of New Sign Posts for Ground Mounted Signs item.

**ITEM 645.80 11 M - FACILITY LOCATION INDICATOR SIGN**

**DESCRIPTION**

This work shall consist of furnishing and installing facility location indicator signs in accordance with the details indicated on the plans, at the locations indicated on the plans or where directed by the Engineer.

**MATERIALS**

Materials shall meet the requirements of the following subsections:

Stainless Steel Connecting Parts	715-16
Aluminum Sign Panels	730-01
Class A Reflective Sheeting	730-05.01
Type IV ReflectORIZED Sheeting Sign Characters	730-12
Stiffeners, Brackets and Miscellaneous Hardware	730-22
Type A Sign Supports	730-24

Sign post lengths, embedment depths and color shall be as indicated on the contract plans.

Sign panel sizes, color, text and/or symbols shall be as indicated on the contract plans.

**CONSTRUCTION DETAILS**

Sign panels and posts shall be constructed in accordance with Subsection 645-3.

Facility location indicator signs shall be installed at the locations shown on the contract plans.

**METHOD OF MEASUREMENT**

This work will be measured as the number of facility location indicator signs satisfactorily furnished and installed.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work. Payment for painting the back of new sign panels and posts will be made separately under the appropriate items.

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**ITEM 08648.5001 M - TEST PIT EXCAVATION (SUBSURFACE EXPLORATIONS)**

**DESCRIPTION:**

This work shall consist of excavating a shallow test pit to the depths, dimensions, and at the locations established by the Engineer. The test pit shall be excavated in a manner to allow an effective and safe visual examination of the subsurface conditions exposed.

**MATERIALS:**

None.

**CONSTRUCTION DETAILS:**

The contractor shall excavate a shallow test pit, to the satisfaction of the Engineer, to allow safe and effective visual examination of subsurface conditions. The methods and equipment used shall be approved by the Engineer. Upon completion, the test pit will be backfilled, compacted, and the site returned to a condition acceptable to the Engineer.

**METHOD OF MEASUREMENT:**

This work will be measured as the number of cubic meters of material excavated as per the test pit dimensions specified by the Engineer.

**BASIS OF PAYMENT:**

The unit price bid for this work shall include the cost of furnishing all labor, materials, and equipment necessary to excavate and backfill the test pit. This specification shall not be used to cover excavations required for the contractor's basic operations.

<u>ITEM 11651.0105M-</u>	<u>FIRE ALARM CONDUIT, HOT-DIPPED GALVANIZED STEEL PIPE (NEW YORK CITY) -2 NPS</u>
<u>ITEM 11651.0107M-</u>	<u>FIRE ALARM CONDUIT, HOT-DIPPED GALVANIZED STEEL PIPE (NEW YORK CITY) -3 NPS</u>

Description:

The Contractor shall furnish and place hot-dipped galvanized steel conduit of the sizes shown on the plans and in the itemized proposal, or as ordered by the Engineer.

Materials:

Conduit, coatings, fittings and supports shall conform to the requirements of the General Specifications for Installation of Underground Conduits and Posts" of the "Specifications for City of New York Fire Department," contained in the publication, "City of New York SPECIFICATIONS - Compiled 1970 for Use with State of New York Department of Transportation Construction Contracts."

Construction Details:

Preparation, testing and installation of conduit and its appurtenances, including driving of the conduit where necessary, shall conform to the requirements of the "General Specifications for Installation of Underground Conduits and Posts." All excavation shall conform to Section 206, "Trench, Culvert and Structure Excavation," of the Standard Specifications. (Metric Edition).

Method of Measurement:

This work shall be measured by the number of linear meters of hot dipped galvanized steel conduit of each size furnished and placed, measured along the axis of the conduit in its final position.

Basis of Payment:

The unit price bid per linear meter shall include the cost of the conduit, fittings and supports, polyethylene rope (where required), all materials necessary to meet the requirements of the "General Specifications for Installation of Underground Conduits and Posts," Labor, equipment and all other materials necessary to complete the work, except that excavation, backfill and restoration of sidewalk and pavement courses will be paid for under Item 206.03M, "Conduit Excavation and Backfill."

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**ITEM 11651.0305 M - FIRE ALARM CABLE, (NEW YORK CITY) 4 PAIR**  
**ITEM 11651.0308 M - FIRE ALARM CABLE, (NEW YORK CITY) 8 PAIR**  
**ITEM 11651.0310 M - FIRE ALARM CABLE, (NEW YORK CITY) 10 PAIR**

**DESCRIPTION:**

The Contractor shall furnish and install multi-conductor, polyethylene insulated, polyvinyl chloride jacketed signal cable at the locations shown on the plans or as ordered by the Engineer.

**MATERIALS:**

The cable shall conform to the requirements of the "Specification for Cable Signal, Polyethylene Insulated, Jacketed", contained in Part III Fire Department Specifications, of the publication City of New York, Department of Transportation, Bureau of Traffic, Division of Street Lighting Specifications (1970 Edition) for Use with State of New York Department of Transportation Construction Contracts. The size and number of conductors in each cable shall be as indicated on the plans.

**CONSTRUCTION DETAILS:**

The Contractor shall install the cable in accordance with the plans and the "General Specifications for Installation of Underground Cables", contained in Part III, Fire Department Specifications, of the publication City of New York, Department of Transportation, Bureau of Traffic, Division of Street Lighting Specifications (1970 Edition) for Use with State of New York Department of Transportation Construction Contracts.

**METHOD OF MEASUREMENT:**

Fire alarm cable will be measured by the number of linear meters of each type cable furnished and installed in accordance with the plans, specifications, and directions of the Engineer.

**BASIS OF PAYMENT:**

The unit price bid per linear meter will include furnishing and installing the cable, and all labor, equipment, materials, tags, and incidentals necessary to complete the work.

**ITEM 11651.1001 M - INSTALL FIRE ALARM FOUNDATION AND POST (NEW YORK CITY)**

**Description:**

This work shall consist of installing fire alarm posts, and furnishing and installing concrete foundations and other appurtenances, at the locations shown on the plans or where ordered by the Engineer.

**Materials:**

Fire alarm post bases, sub-bases, post caps and bolts will be furnished to the Contractor by the Fire Department at a designated storeyard. All other materials shall be furnished by the Contractor and shall conform to the requirements of the "General Specifications for Installation of Underground Conduits and Posts," contained in the publication "City of New York SPECIFICATIONS - Compiled 1970 for Use with State of New York Department of Transportation Construction Contracts" and Fire Department Standard Drawings 141 and TB-1330.

**Construction Details:**

The fire alarm posts, concrete foundations and appurtenances shall be installed in accordance with the plans, Fire Department Standard Drawing 141 and the "General Specifications for Installation of Underground Conduits and Posts." Excavation and backfill shall conform to Section 206, "Trench, Culvert and Structure Excavation," of the Standard Specifications (Metric Edition).

The Contractor shall take special precautions to prevent damage to the fire alarm post bases, sub-bases, post caps and bolts during transporting and installing, and shall replace with new and equal material acceptable to the Engineer and the Fire Department at his own expense, all parts damaged or missing.

**Method of Measurement:**

This work shall be measured by the number of fire alarm posts, complete with foundations and appurtenances, installed in accordance with the plans, specifications and as directed by the Engineer.

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**ITEM 11651.1001 M - INSTALL FIRE ALARM FOUNDATION AND POST (NEW YORK CITY)**

**Basis of Payment:**

The unit price bid shall cover the cost of the loading and transporting the base, sub-base, post cap and bolts from the Fire Department storeyard; installing the base, sub-base, post cap and bolts; furnishing and installing the concrete foundation and appurtenances including boiler tubing sleeves with concrete encasement, 90° bends, nipples, bushings, caps and plugs; furnishing and installing subsidiary conduits; restoring sidewalk or constructing concrete slab; excavation and backfill, cinders, sandfill, labor, equipment and all other materials necessary to complete the work.

**ITEM 11655.17 M - RESETTING EXISTING UTILITY SERVICE FRAMES****DESCRIPTION.**

This work shall consist of removing, storing, and resetting existing utility service frames, complete with grates, covers, and appurtenances, to grade.

**MATERIALS.**

Materials shall meet the requirements of the following subsections of Section 700, "Materials Details."

Concrete Brick	704-02
Mortar for Concrete Masonry	705-21
Precast Concrete Drainage Units	706-04

Concrete shall be Class A, meeting the requirements of Section 501. "Portland Cement Concrete-General."

**CONSTRUCTION DETAILS.**

The existing frames, grates, covers, and appurtenances shall be removed, stored if necessary, cleaned and reset to the line and grade indicated in the plans or as directed by the Engineer.

The existing masonry adjustment collar, or a portion of it, shall be removed where necessary for resetting of the existing frame, as determined by the Engineer. The existing frames shall be set to grade using concrete brick and mortar and/or Class A concrete. Where ordered by the Engineer, the frames shall be set in a mortar bed on the existing structure.

Where large adjustments in grade are necessary, precast concrete units may be used in conjunction with masonry for fine adjustment.

**METHOD OF MEASUREMENT.**

This work shall be measured by the number of existing utility service frames, complete with grates, covers, and appurtenances, reset to grade on existing utility service structures.

**BASIS OF PAYMENT.**

The unit price bid for resetting each utility service frame shall include the cost of all labor, materials, and equipment necessary to complete the work; including any necessary removal and replacement of pavement and shoulder courses, sub-courses, curbs, sidewalks, lawns and other top surfaces, unless otherwise indicated in the plans or proposal.

All frames, grates, covers, and appurtenances broken through carelessness on the part of the Contractor shall be replaced at the Contractor's expense.

**ITEM 11656.9004 M – MANUFACTURED METAL CLADDING****DESCRIPTION**

This work shall consist of furnishing and installing of stainless steel wall panel as shown on the contract plans and in accordance with these specifications.

**MATERIALS****A. MATERIAL REQUIREMENTS:**

1. Stainless Steel Sheet: ASTM A666, Type 316, dead soft, fully annealed.
  - 20 gage, stainless steel sheet, smooth surface.
  - Finish – dull matte, non-reflective, non-directional.
2. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads.
  - Use stainless steel fasteners of size as required by manufacturer.
3. Galvanized steel furrings and shims.
4. Sealant for use at metal-to-metal locations. One part cold-applied, non-sagging silicone sealant: Dow Corning 795 Silicone Building Sealant or approved equal.
5. Sealant for use at locations between metal and masonry. One-part low-medium modulus silicone sealant (plus or minus 50% movement); ASTM C920 classifications type S, grade NS, Class 25, uses NT, M, G, and A: General Electric Silpruf, Dow Corning's 791, Pecora's 864, Sonneborn's Omniseal, or Tremco Spectrem 2, or approved equal.
6. Silicones shall meet the following requirements:
  - ASTM C719 - Low-Medium Modulus (+ or - 50%). Sealants shall not exhibit any cracking or surface degradation after 5,000 hours exposure in the Atlas Twin Arc Weatherometer.
  - ASTM C661 - Shall not incur a durometer increase greater than 10 points.
  - Sealants shall contain zero parts of toxic isocyanurate ingredients.

**CONSTRUCTION DETAILS****A. SUBMITTALS:**

1. Product Data: Include manufacturer's product specifications, standard details, certified product test results, and general recommendations, as applicable to materials and finishes for each component and for total panel assemblies.
2. Shop Drawings: Shop drawings shall be submitted to the Engineer for review and

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approval. Show layouts of panels, details of corner conditions, joints, panel profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled works.

- a. For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by a professional engineer, licensed in the state of New York.
3. Samples for Initial Selection: Manufacturer's color charts or chips showing the full range of colors, textures, and patterns available for wall panels with factory-applied finishes.
4. Samples for Verification: Provide sample panels 300 mm (12 inches) long by actual panel width, in the profile, style, color, and texture indicated. Include clips, caps, battens, fasteners, closures, and other exposed panel accessories.
5. Product Test Reports: Indicate compliance of manufactured wall panel assemblies and materials with performance and other requirements based on comprehensive testing of current products.
6. Qualification data: Indicate that the installer is factory certified with no less than five (5) years experience; include a list of successfully completed metal wall panel projects similar in material, design, and extent to that indicated for this Project.
7. Mockups: Before installing wall panels, construct mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using exposed and concealed materials indicated for the completed Work.
  - a. Obtain Engineer's approval of mockups before proceeding with construction of wall panels.
  - b. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

**B. PERFORMANCE REQUIREMENTS**

1. Provide manufactured wall panel assemblies complying with performance requirements indicated and capable of withstanding structural movement, thermally induced movement, and exposure to weather without failure or infiltration of water into the building interior.
2. Water Penetration: Provide manufactured wall panel assemblies with no water penetration as defined in the test method when tested according to ASTM E331 at a minimum differential pressure of 20 percent of inward acting, wind-load design pressure of not less than 300 Pa (6.24 lb/sq. ft.) and not more than 575 Pa (12.0 lb/sq. ft.).

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3. **Structural Performance:** Provide manufactured wall panel assemblies capable of withstanding design wind loads indicated under in-service conditions with deflection no greater than the following, based on testing manufacturer's standard units according to ASTM E330 by a qualified independent testing and inspecting agency.
  - a. **Maximum Deflection:** 1/180 of the span.
4. **Wind Loads:** wall panel assemblies, including anchorage, shall be capable of withstanding minimum wind load design pressures of 1,676 Pa (35 psf) positive and 2,873 Pa (60 psf) negative.

**C. FABRICATION / MOCKUPS:**

Panels shall be fabricated to the dimensions shown on the contract plans, and in compliance with these specifications.

1. Fabricate panel sheets to the profile or configuration indicated; and of the material, finish, and thickness indicated. Design joints between panels to form weather tight seals.
2. Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

**D. INSTALLATION OF METAL PANELS:**

1. Inspection of metal wall panels. Immediately prior to installation, the metal wall panels shall be inspected for damage. Significant bend or dents in the panel shall constitute sufficient cause for rejection. Straightening of such bends or dents shall not be allowed.
2. All panels shall be installed in accordance with approved shop drawings.
3. Comply with panel manufacturer's written instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the Work securely in place, with provisions for thermal and structural movement.
  - a. Field cutting panels by torch is not permitted.
  - b. Install panels with concealed fasteners.
4. **Accessories:** Install components required for a complete wall panel assembly including

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trim, copings, fasciae, corner units, clips, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

5. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of wall panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not otherwise indicated, types recommended by panel manufacturer.
  - a. Thoroughly clean surfaces on which sealant is to be applied and prime surfaces as recommended by Manufacturer before applying sealant.
  - b. Flash and seal panels at lap ends and intersections with other materials with rubber, neoprene, or other closures to exclude weather.
6. Installation Tolerances: Shim and align panel units within installed tolerance of 6 mm in 6 m on level, plumb, and location lines as indicated and within 3-mm offset of adjoining faces and of alignment of matching profiles.

### E. CLEANING AND PROTECTING

1. Replace panels and other components of the Work that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
2. Remove temporary protective coverings and strippable films. On completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

### METHOD OF MEASUREMENT

This work will be measured as the number of actual square meters of the stainless steel wall panels actually furnished and installed, as specified in the contract documents. The measurements will be taken along the front face of the wall. Measurement will not include any sample wall sections not incorporated into the work.

### BASIS OF PAYMENT

The unit price bid shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including the cost of any repairs required. No payment shall be made for panels that are replacements for panels that have been rejected.

**ITEM NO. 39657.0010 M - PANELBOARDS AND CIRCUIT BREAKERS**

**DESCRIPTION.** This work shall consist of furnishing and installing panelboards and circuit breakers indicated on the contract drawings.

**MATERIALS****PANELBOARDS**

All panelboards shall be supplied for 120/208 volts, 3 phase, 4 wire, 60 hertz. A.C. Ratings shall be as shown on the Contract drawings.

All panelboards shall be NEMA 12, of the enclosed type, dead front, flush or surface mounted, in steel cabinets, No. 10 gauge, with steel trim, concealed hinges, doors and flush type locks.

All buses shall be hard-drawn copper and sized on the Basis of 1000 amperes per square inch cross-section area Buses shall be arranged for sequence phasing. Straps for breaker connections shall also be copper. Panel shall be equipped with solid copper neutral bar.

Panelboards shall be equipped with quick-make, quick-break molded case circuit breakers, of voltage required, and of size and number of poles indicated in schedules on contract Drawings. Circuit breakers shall meet the requirements of UL Standard 489.

Cabinets for new panelboards shall be of sufficient size to allow a gutter space of at least six inches on all sides around panels.

Boxes and trims shall be sheet steel and electro-galvanized or hot dipped galvanized after fabrication with prime and finish coat of gray enamel.

Trim shall be door-in-door type in one piece so designed that doors will close without a rabbet. Doors shall be fastened to a cabinet with flush butt hinges. The doors shall be constructed of No. 10 gauge stainless steel, suitably reinforced, and shall be provided with New York City standard lock operated by a No. 9 key and No. 47 key change. Trims shall be fastened to a cabinet by means of approved adjusting clamps or screws. Where cabinet is flush mounted the trim shall extend 1" on all sides beyond the edge of cabinet.

A typewritten directory 5 inches by 8 inches with metal frame and plexiglass face shall be furnished and installed upon the inside of the door of each cabinet, indicating the service controlled by each circuit. Alternate phases shall be used in consecutive circuit numbering. Total load on panel shall be divided amongst all phases as evenly as possible.

Panelboards shall be as manufactured by Square D type NQOD, Siemens type Sentron S1, General Electric type AL series or equal.

**CIRCUIT BREAKERS**

Manufactured and tested in strict conformance with the latest revisions of NEMA Standard AB 1.

Trip free, thermal-magnetic, ambient compensated, bolt-on type, quick-make, quick-break with one trip element per pole and trip rating as indicated on the Contract drawings.

## **ITEM NO. 39657.0010 M - PANELBOARDS AND CIRCUIT BREAKERS**

For multiple breakers, quick-make, quick-break, trip-free having common trip features so that operation of a trip device in any of the poles will cause all poles to open regardless of the breaker operating handle being locked in the "on" position.

When the breaker handle is not locked or operated by external device it shall indicate a tripped condition.

Circuit breakers shall have thermally operated, inverse time limit, tripping elements that will not trip the breaker on harmless momentary overloads. Rapid interruption of short circuit currents accomplished with an instantaneous magnetic trip element and shall be UL listed for copper wire.

Contacts silver-plated tungsten-copper alloy, to reduce pitting and burning,

Branch circuit breaker shall conform to the following:

120/208 volt panelboard branch circuit breakers bolt-in or plug-in mounted with minimum NEMA interrupting rating of 65,000 minimum amps A/C asymmetrical non-inter-changeable type.

Main circuit breaker shall be Siemens type JXD6 or General Electric Type TJD or Square D Type EGB or equal.

### **INSTALLATION DETAILS.**

Panelboards and Circuit Breakers shall be installed at locations shown on the contract drawing. Panelboards shall be secured to the walls with approved installation hardware.

Mounting bolts, nuts, washers and other detail parts used for fastening the panelboards, shall be of stainless steel conforming to the requirements of the ASTM Designation A276, Type 316. Bolt heads and nuts shall be hexagonal, and shall be provided with medium series lock washers. Bolts smaller than 1/2-inch in diameter shall not be used except as may be necessary to fit the mounting holes in switches, boxes and similar standard devices.

Expansion anchors for fastening equipment or brackets to concrete surfaces shall be wedge type anchor bolts, which shall be locked in place by an expansion wedge as the nut is tightened. All parts of the expansion anchors shall be of Type 303 stainless steel. Holes for the anchors shall be drilled to the size and depth, recommended by the manufacturer, using carbide tipped masonry drills.

**METHOD OF MEASUREMENT.** No measurement will be taken for the work of this item. Payment for this work will be made on a lump sum basis.

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**ITEM NO. 39657.0010 M - PANELBOARDS AND CIRCUIT BREAKERS**

**BASIS OF PAYMENT.** The lump sum price bid for this item shall include the cost of all labor, materials installation hardware and equipment necessary to satisfactorily complete the work in accordance with the Contract Plans and Specifications. The cost of testing, and associated appurtenances shall be included in the price.

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<b>ITEM 658.5001</b>	<b>11 M -</b>	<b>MONITORING/DEWATERING WELL REMOVAL</b>
<b>ITEM 658.5002</b>	<b>11 M</b>	<b>MONITORING/DEWATERING WELL GROUTING</b>

**DESCRIPTION**

This work shall consist of the sealing/filling and removal of monitoring or dewatering wells as detailed in this specification. Estimated depth and locations of wells to be removed are shown on the Contract Drawings.

**MATERIALS**

Well sealing material to be used is as per subsection 732-01 Cement Grouting Material.

**CONSTRUCTION DETAILS**

The Engineer will determine that the well is no longer necessary for monitoring or dewatering. Abandoned monitoring or dewatering wells shall be sealed/filled/removed in accordance with following procedures:

1. A well shall be measured for depth prior to sealing to ensure that it is free from any obstructions that may interfere with sealing operations.
2. On-end reinforced concrete pipe section, casting, valve box and valve box casting and/or any casing that is within 2 m of proposed subbase must be removed and properly disposed off.
3. Well shall be completely filled by pressure cement grouting material in place as primary sealing material. Grout shall be placed from the bottom upwards using methods that will avoid segregation or dilution of material. During pressure grouting procedure, a minimum of 175 kPa must be maintained for five minutes or until pumping refusal.
4. Complete, accurate records of abandonment procedures shall be kept for each well abandoned. The record of abandonment shall include, at a minimum, the depth of each layer of all sealing and backfill material, the quantity of sealing materials used, measurements of static water levels and depths and any changes made in the well during sealing. A copy of these records shall be submitted to engineer and a copy kept on site in the Contractor's field office for the duration of construction activities.
5. The Engineer will determine whether the well assembly materials shall be delivered to the owner or disposed of.

**METHOD OF MEASUREMENT**

Monitoring/Dewatering Well Removal - Payment for this work will be measured as the number of monitoring and dewatering wells removed in accordance with the plans and specifications.

Monitoring/Dewatering Well Grouting - Payment for this work will be made for the number of cubic meters of grout pumped as determined by the Engineer.

**BASIS OF PAYMENT**

The prices bid shall include all labor, materials and equipment to complete the work, including removed well materials delivery or disposal.

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**ITEM 11660.0101 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 0.5 NPS**

**ITEM 11660.0102 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 0.75 NPS**

**ITEM 11660.0103 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 1 NPS**

**ITEM 11660.0104 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 1.25 NPS METER**

**ITEM 11660.0105 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 1.5 NPS**

**ITEM 11660.0106 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 2 NPS**

**ITEM 11660.0108 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 3 NPS**

**ITEM 11660.0110 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 4 NPS**

**Description:**

The Contractor shall furnish and place hot dipped galvanized steel conduit of the sizes shown in the plans and in the itemized proposal, or as ordered by the Engineer.

**Materials:**

Conduit, coatings, fittings, and supports shall conform to the requirements of the "General Specifications for Street Lighting Facilities," contained in the publication "City of New York SPECIFICATIONS - Compiled 1970 for Use with State of New York Department of Transportation Construction Contracts."

**Construction Details:**

Preparation, testing and installation of conduit and its appurtenances, including driving of the conduit where necessary, shall conform to the requirements of the "General Specifications for Street Lighting Facilities." All excavation shall conform to Sec. 206, "Trench, Culvert and Structure Excavation" in the Standard Specifications, (Metric Edition).

**Method of Measurement:**

This work shall be measured by the number of linear meters of hot dipped galvanized steel conduit of each size furnished and placed, measured along the axis of the conduit in its final position.

- ITEM 11660.0101 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 0.5 NPS**
- ITEM 11660.0102 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 0.75 NPS**
- ITEM 11660.0103 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 1 NPS**
- ITEM 11660.0104 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 1.25 NPS METER**
- ITEM 11660.0105 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 1.5 NPS**
- ITEM 11660.0106 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 2 NPS**
- ITEM 11660.0108 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 3 NPS**
- ITEM 11660.0110 M- CONDUIT, HOT DIPPED GALVANIZED STEEL PIPE (BUREAU OF GAS AND ELECTRICITY - 4 NPS**

**Basis of Payment:**

The unit price bid per linear meter shall include the conduit, fittings and supports, drag wire where required, all labor and other materials and equipment necessary to complete the work, except that excavation, backfill, and restoration of sidewalk and pavement courses will be paid for under Item 206.03 M "Conduit Excavation and Backfill."

**ITEM 11660.0807 M - CONCRETE SIDEWALK BOX, TYPE 1812 (BUREAU OF GAS AND ELECTRICITY)**

**ITEM 11660.0808 M - CONCRETE SIDEWALK BOX, TYPE 2418 (BUREAU OF GAS AND ELECTRICITY)**

**ITEM 11660.0809 M - CONCRETE SIDEWALK BOX, TYPE 3018 (BUREAU OF GAS AND ELECTRICITY)**

**ITEM 11660.0810 M - CONCRETE SIDEWALK BOX, TYPE 3618 (BUREAU OF GAS AND ELECTRICITY)**

**ITEM 11660.0811 M - CONCRETE SIDEWALK BOX, TYPE 3624 (BUREAU OF GAS AND ELECTRICITY)**

**ITEM 11660.0812 M - CONCRETE SIDEWALK BOX, TYPE 4824 (BUREAU OF GAS AND ELECTRICITY)**

### **DESCRIPTION**

Under this work, where shown on the plans or where directed by the Engineer, the Contractor shall construct concrete sidewalk boxes of the type called for on the plans.

### **MATERIALS**

The various components of the sidewalk boxes shall be as specified in the "General Specifications for Street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS - Compiled 1970 for Use with State of New York Department of Transportation Construction Contracts" and Bureau of Gas and Electricity Standard Drawings J-3179-A and H-5105, except that concrete shall be Class A meeting the requirements of Section 501, "Portland Cement Concrete - General" of the Standard Specifications.

If the concrete is precast, the concrete shall meet the requirements of Class A Concrete in Section 501, "Portland Cement Concrete - General" except that the requirements for inspection facilities, automated batching controls and recordation do not apply. The batching, mixing and curing methods, and the inspection facilities shall meet the approval of the Department or its representative. The Contractor may submit, for approval by Deputy Chief Engineer, Technical Services, a mix at least equivalent to the specified Class A Concrete.

### **CONSTRUCTION DETAILS**

The sidewalk boxes shall be constructed in accordance with the plans, the "General Specifications for Street Lighting Facilities" and Bureau of Gas and Electricity Standard Drawings J-3179-A and H-5105. Excavation and backfill shall conform to Section 206 "Trench, Culvert and Structure Excavation" of the Standard Specifications.

### **METHOD OF MEASUREMENT**

This work shall be measured by the number of concrete sidewalk boxes of each type completed as specified..

### **BASIS OF PAYMENT**

The unit price bid per sidewalk box shall include the cost of all excavation, backfill, concrete, frames, covers, reinforcement, broken stone, grounding rods and wires where required, labor, equipment, and all other materials necessary to complete the work.

**ITEM 11660.0901 M - CONCRETE ROADWAY BOX, TYPE 1812 (BUREAU OF ELECTRIC CONTROL)**

**ITEM 11660.0902 M - CONCRETE ROADWAY BOX, TYPE 2418 (BUREAU OF ELECTRIC CONTROL)**

**ITEM 11660.0903 M - CONCRETE ROADWAY BOX, TYPE 3018 (BUREAU OF ELECTRIC CONTROL)**

**ITEM 11660.0904 M - CONCRETE ROADWAY BOX, TYPE 3618 (BUREAU OF ELECTRIC CONTROL)**

**ITEM 11660.0905 M - CONCRETE ROADWAY BOX, TYPE 3624 (BUREAU OF ELECTRIC CONTROL)**

**ITEM 11660.0906 M - CONCRETE ROADWAY BOX, TYPE 4824 (BUREAU OF ELECTRIC CONTROL)**

**DESCRIPTION:**

Under this work, where shown on the plans or where directed by the Engineer, the Contractor shall construct concrete roadway boxes of the type called for on the plans.

**MATERIALS:**

The various components of the roadway boxes shall be as specified in the "General Specifications for Street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS-Compiled 1970 for Use with State of New York Department of Transportation Construction Contracts" and Bureau of Electric Control Standard Drawings J-3179-B and H-5019, except that concrete shall be Class A meeting the requirements of section 501, "Portland Cement Concrete - General," of the Standard Specifications (Metric Edition).

If unit is Precast, the unit shall meet the requirements of 723-45 "Precast Reinforced Concrete Foundations and Pullboxes".

**CONSTRUCTION DETAILS:**

The roadway boxes shall be constructed in accordance with the plans, the "General Specifications for Street Lighting Facilities", and Bureau of Electric Control Standard Drawings J-3179-B and H-5019. Excavation and backfill shall conform to Section 206 "Trench, Culvert and Structure Excavation" of the Standard Specifications (Metric Edition).

**METHOD OF MEASUREMENT:**

This work shall be measured by the number of concrete roadway boxes of each type completed as specified.

**BASIS OF PAYMENT:**

The unit price bid per roadway box shall include the cost of all excavation, backfill, concrete, frames, covers, reinforcement, broken stone, grounding rods and wires where required, labor, equipment, and all other materials necessary to complete the work.

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**ITEM 11660.2810 M - INSTALL AIRCOCK HYDRANT ASSEMBLY (BUREAU OF WATER SUPPLY)**

**Description:**

Under this item the Contractor shall install aircock hydrant assemblies where shown on the plans or as directed by the Engineer.

**Materials:**

The aircock hydrant assembly shall include a hydrant, hydrant drain base, hydrant valve, hydrant valve box and cover, and necessary straight lengths of 6 NPS ductile cast iron and steel pipe to connect the aircock hydrant to a main. The Bureau of Water Supply will furnish the aircock hydrant assembly at a Bureau of Water Supply storeyard, complete, except for pipe, broken stone, concrete and other miscellaneous materials.

All materials furnished by the Contractor shall conform to the requirements specified in the applicable sections of the NYC Bureau of Water Supply "Standard Watermain Specifications" (latest revision).

**Construction Details:**

The hydrant assemblies shall be installed in conformance with the plans, Bureau of Water Supply Standard Drawings 11576A-Z, 18581-B-Z, 31050-Z, 38226-Y-A, all latest revisions and the NYC BWS "Standard Water Main Specifications" (latest revision).

The Contractor shall take special precaution to prevent damage to the hydrant assembly during transportation and installing, and shall replace with new and equal material acceptable to the Engineer and the Bureau of Water Supply at his own expense, all parts damaged or missing.

**Method of Measurement:**

The quantity to be paid for under this item will be the number of aircock hydrant assemblies installed as specified.

**Basis of Payment:**

The unit price bid per hydrant assembly shall include the cost of loading and transporting the aircock hydrant assembly from the NYC Bureau of Water Supply Storeyard; installing the aircock hydrant assembly complete; furnishing and installing concrete foundation for the valve box; furnishing and installing concrete foundation for the hydrant (where required); furnishing and installing straight lengths of ductile cast iron and steel pipe; installing hydrant drains including 0.75 NPS pipe;

**ITEM 11660.2810 M - INSTALL AIRCOCK HYDRANT ASSEMBLY (BUREAU OF WATER SUPPLY)**

furnishing and installing broken stone and concrete boxes (where required); painting and stenciling the hydrant; concrete collar (where required); labor, equipment and all other materials necessary to complete the work, except for the following:

Trench and culvert excavation, backfill, temporary sheeting piling and ductile cast iron specials will be paid for separately under their appropriate items.

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**ITEM 11660.8067 M - FURNISHING, INSTALLING AND TESTING CORROSION CONTROL SYSTEM**

**Description:**

The Contractor shall furnish all labor, equipment and materials and install and test approved complete corrosion control system for the protection of water mains and appurtenances installed under this contract.

The Contractor shall sub-contract the services of an approved specialist or specialists having proven expertise in installing and testing or supervising the installation and testing the corrosion control system. The Contractor shall submit to the N.Y.C. Department of Design and Construction for approval the selected specialist or specialists.

**Materials:**

All materials shall be in accordance with the New York City Bureau of Water Supply "Standard Watermain Specifications" (latest revision) and "Specification for Furnishing, Delivering and Laying Steel Pipe and Appurtenances".

**Construction Details**

The corrosion control system shall be constructed according to the Contract Drawings and the NYC Bureau of Water Supply "Standard Watermain Specifications (latest revision) and "Specification for Furnishing, Delivering and Laying Steel Pipe and Appurtenances".

Pavement excavation and Full Depth Repair shall be in accordance with the contract plans.

**Installation**

The corrosion control system shall be installed in strict conformance with the requirements shown on the approved design drawings and in the above listed NYCBWS specifications.

All work in connection with the installation of the corrosion control system shall be done under the surveillance and direct supervision of the specialist or specialists to verify that the installation is made in strict accord with the drawings and specifications.

After the corrosion control system is activated, a survey by electrical measurements and inspections shall be conducted to determine that protection has been established in accordance with the applicable criteria and that each part of the system is operating properly and efficiently.

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**ITEM 11660.8067 M - FURNISHING, INSTALLING AND TESTING CORROSION CONTROL SYSTEM**

Based on the survey and inspections, the sub-contractor shall perform all necessary work to bring the protection up to applicable standards.

**Method of Measurement:**

Where the work to be performed falls within the specifications for a work item that has a contract price, the units of work shall be computed at the proper contract price for lump sum payment as hereinafter stated. Should the work not be comparable to the project work under the applicable contract items, the Contractor shall be ordered to perform the work on a force account basis, or by agreed unit prices as approved by the Regional Construction Supervisor with Main Office assistance if necessary.

The lump sum of money shown in the itemized proposal for this work will be considered the price bid even though payment will be made only for actual work performed. This lump sum figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figure will be disregarded, and the original price will be used to determine the total amount bid for the contract.

The quantity to be paid for will be computed by one or any combination of the following methods:

1. Where contract bid items cover the work ordered, the amount obtained by the product of the quantity and the unit bid price of the items.
2. Where no contract bid items are available, the amount obtained by the product of the item quantity and the agreed upon unit prices.
3. By force account records where bid prices do not exist and agreed prices are not available for the work items.

**Basis of Payment:**

The price set forth in the proposal for the furnishing, installing and testing of the corrosion control system shall include all labor, materials, expenses and equipment necessary to complete the installation and testing as set forth in these specifications and as approved by the N.Y.C. Bureau of Water Supply.

The unit price set forth in the proposal is a fixed price for all bidders and shall not be changed. The published price has been prepared taking into account the cost of furnishing all labor material and equipment necessary to complete the work.

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ITEM 11661.0301 M – INSULATED CONDUCTOR NO. 14 (BEC)  
ITEM 11661.0302 M – INSULATED CONDUCTOR NO. 12 (BEC)  
ITEM 11661.0303 M – INSULATED CONDUCTOR NO. 10 (BEC)  
ITEM 11661.0304 M – INSULATED CONDUCTOR NO. 8 (BEC)  
ITEM 11661.0305 M – INSULATED CONDUCTOR NO. 6 (BEC)  
ITEM 11661.0306 M – INSULATED CONDUCTOR NO. 2 (BEC)  
ITEM 11661.0307 M – INSULATED CONDUCTOR NO. 1/0 (BEC)  
ITEM 11661.0308 M – INSULATED CONDUCTOR NO. 2/0 (BEC)  
ITEM 11661.0309 M – INSULATED CONDUCTOR NO. 3/0 (BEC)  
ITEM 11661.0310 M – INSULATED CONDUCTOR NO. 4/0 (BEC)  
ITEM 11661.0311 M – INSULATED CONDUCTOR 250 MCM (BEC)  
ITEM 11661.0312 M – INSULATED CONDUCTOR 300 MCM (BEC)  
ITEM 11661.0313 M – INSULATED CONDUCTOR 350 MCM (BEC)  
ITEM 11661.0314 M – INSULATED CONDUCTOR 400 MCM (BEC)  
ITEM 11661.0315 M – INSULATED CONDUCTOR 450 MCM (BEC)  
ITEM 11661.0317 M – INSULATED CONDUCTOR 500 MCM (BEC)

**DESCRIPTION:**

Under this work the Contractor shall furnish and install insulated conductor of the sizes shown in the plans, on the applicable NYC Bureau of Electrical Control standard drawings, and in the itemized proposal or as ordered by the Engineer.

**MATERIALS:**

The wire shall be type USE-RHW, cross linked polyethylene insulated and conform to the requirements of the "General Specifications for Street Lighting Facilities" as published by the City of New York, Bureau of Electrical Control.

**CONSTRUCTION DETAILS:**

The Contractor shall furnish, install and test the conductors in conformance to the "General Specifications for Street Lighting Facilities" as published by the City of New York, Bureau of Electrical Control. Splicing, racking, placement of cable supports, etc., where required, shall conform to the same, except that the taping method of completing a splice will not be allowed and only the poured epoxy method shall be used.

**METHOD OF MEASUREMENT:**

This work will be measured as the number of linear meters of each size of conductor furnished and installed.

**BASIS OF PAYMENT:**

The unit price bid per linear meter shall include furnishing, installing, connecting, splicing and supporting the conductor, and all materials, labor, equipment and incidentals necessary to complete the work.

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**ITEM 11661.2402 M - REMOVE FOUNDATION FOR LAMPOST**  
**(BUREAU OF GAS AND ELECTRICITY)**

**Description:**

Under this item the Contractor shall remove the existing lamppost foundations designated for removal on the plans or ordered removed by the Engineer.

**Materials:**

Not specified.

**Construction Details:**

The requirements of the "General Specifications for Street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS - Compiled 1970 for use of with State of New York Department of Transportation Construction Contracts", shall apply.

The removed concrete foundations shall become the property of the contractor and shall be removed by him from the contract site.

The hole resulting from removing the foundation shall filled with approved material and compacted as directed by the Engineer.

**Method of Measurement:**

The quantity to be paid for under this item will be the number of lamppost foundations removed in accordance with the plans, specifications and orders of the Engineer.

**Basis of Payment:**

The unit price bid for this item shall include the cost of all labor, materials and equipment necessary to satisfactorily complete the work, including excavation, disposal and fill.

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**ITEM 11661.52 M - REMOVE LAMPOST LUMINAIRE (BUREAU OF GAS AND ELECTRICITY)**

**DESCRIPTION**

Under this item the Contractor shall remove existing lamppost luminaires, where shown on the plans or where directed by the Engineer and the N.Y.C. Bureau of Gas and Electricity.

**MATERIALS**

(Not Specified).

**CONSTRUCTION DETAILS**

Lamppost luminaires shall be removed in a neat and workmanlike manner in accordance with the "General Specifications for Street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS - Complied 1970 for Use with State of New York Department of Transportation Construction Contracts".

All luminaires removed shall remain the property of the Bureau of Gas and Electricity. The Contractor shall remove the existing equipment and neatly store its component parts in separate piles at locations on the job site designated by the Engineer for future pick-up by New York City.

**METHOD OF MEASUREMENT**

This work will be measured as the number of luminaires completely removed in accordance with the plans, specifications and orders of the Engineer.

**BASIS OF PAYMENT**

The unit price bid for each lamppost luminaire removed shall include the cost of all labor, materials and equipment necessary to complete the work. Removal of the bracket arms, poles, and concrete foundations, if required, will be paid for under their appropriate pay items.

**ITEM 662.05020111 - INSTALL CONCRETE ENCASED 2 NPS STEEL CONDUIT  
(CON EDISON)**

**ITEM 662.05040111 - INSTALL CONCRETE ENCASED 4 NPS STEEL CONDUIT  
(CON EDISON)**

**ITEM 662.05050111 - INSTALL CONCRETE ENCASED 5 NPS STEEL CONDUIT  
(CON EDISON)**

**DESCRIPTION**

Under this item, the Contractor shall provide all labor, equipment and specified materials required to install concrete encased steel electric conduit and appurtenances for Con Edison transmission and distribution system ducts and/or service feeds to street lights, traffic signals and public telephone facilities, as specified herein and as indicated on the contract drawings in accordance with the specifications and directions of the Engineer.

All work shall be in accordance with Con Edison requirements. Con Edison standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
Region 11 - Hunters Point Plaza  
47-40 21st Street  
Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions.

**MATERIALS**

- A. Steel conduit and fittings (EO-9000, EO-10864-D and EO-2742-C) will be furnished in commercial lengths by Con Edison. The Contractor shall furnish all other materials required, including materials for the coating, joining or temporary support of the conduit.
- B. Concrete for encasement shall be as specified on EO-1008 Class III.
- C. Installation of public telephone foundation base materials and appurtenances consisting of fish plates, spacers and ground coils furnished by ECS will be paid for separately under the appropriate item.
- D. All materials provided by Con Edison will be delivered to the Contractor at the construction site and unloaded by the Contractor. The Contractor shall be responsible for the loss, theft of or damage to all materials and equipment furnished by Con Edison. The Contractor shall unload all materials in such a manner as to prevent damage and shall use appropriate devices to protect pipe coatings, etc. while handling. It shall be the responsibility of the Contractor to ensure that all materials are complete and free of defects or damage upon receipt. The Contractor shall provide suitable protection from theft or damage for all materials at the construction site. If the Contractor fails to inspect the material or accepts the material and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense.

- ITEM 662.05020111 - INSTALL CONCRETE ENCASED 2 NPS STEEL CONDUIT**  
**(CON EDISON)**
- ITEM 662.05040111 - INSTALL CONCRETE ENCASED 4 NPS STEEL CONDUIT**  
**(CON EDISON)**
- ITEM 662.05050111 - INSTALL CONCRETE ENCASED 5 NPS STEEL CONDUIT**  
**(CON EDISON)**

- E. The Contractor shall submit to Con Edison at least 5 working days prior to the start of construction a detailed bill of materials required and material delivery schedule, to assure adequate time to procure all necessary materials.
- F. Excess materials furnished by Con Edison and not incorporated in the work shall be returned by the Contractor to the designated Con Edison storage yard for off-loading by Con Edison personnel.

**CONSTRUCTION DETAILS:**

- A. Installation of concrete encased steel conduit shall be in accordance with the plans and Con Edison reference specifications EO-8014-3, EO-2742 and the applicable provisions of EO-1032-9. The Contractor shall be responsible for the cutting and threading and the bending of random pipe lengths as necessary and for all other work required to install the conduits completely in place.
- B. Conduit formations shall be as indicated on the plans and in accordance with EO-7326-B and the applicable provisions of EO-14903-C.
- C. At points of entry into electric boxes and manholes, steel conduit shall be grouted into existing structure or new precast walls or embedded in new field-constructed walls. Where directed by Con Edison, use flare-end conduit at box/manhole entrances or transition to precast concrete duct and use bell-end conduit sections grouted into structure wall (EO-1042, EO-9799D and EO-9508-C). Installed conduits shall be faced off within the structure and properly sealed (EO-1100). Where connection to existing conduit is required, use adaptors provided by Con Edison.
- D. Concrete encased steel conduit services to proposed signal poles, light poles and public telephone facilities shall include installation of above-grade conduit stubs, properly capped or plugged (EO-10864-D) at elevations indicated on the plans or as directed by the Engineer, to facilitate subsequent pole foundation or telephone base installation covered under separate payment items. Any drilling of existing foundations for conduit installation at existing street light/traffic signal poles, where required, shall be performed by the Contractor at no additional cost.
- E. New ducts shall be rodded, brushed, mandrelled (EO-4410-C) and roped as specified. Remove all debris. Inspection and acceptance of the duct system will be in accordance with EO-1063.

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**ITEM 662.05020111 - INSTALL CONCRETE ENCASED 2 NPS STEEL CONDUIT**  
**(CON EDISON)**

**ITEM 662.05040111 - INSTALL CONCRETE ENCASED 4 NPS STEEL CONDUIT**  
**(CON EDISON)**

**ITEM 662.05050111 - INSTALL CONCRETE ENCASED 5 NPS STEEL CONDUIT**  
**(CON EDISON)**

- F. If due to subsurface conditions, the cover is less than 508 mm from finish grade, the duct shall be protected with steel plates furnished by Con Edison, for which payment will be made separately under the appropriate item.

#### **METHOD OF MEASUREMENT**

The quantity to be paid for under this section shall be the actual number of linear meters of concrete encased steel conduit installed, as measured along the longitudinal axis of each conduit in its final position from existing conduit connection to inside face of box/manhole, or from box to box (inside faces) as appropriate and shall include capped stubs left above grade for embedment in signal pole/light pole foundations or public telephone bases.

#### **BASIS OF PAYMENT**

The unit price bid per linear meter of concrete encased steel conduit installation shall include all labor, equipment, and specified materials required to perform the work as outlined herein, complete in place. Where conduits are to be connected to manholes, the cost of constructing entrances into the manholes, installing and sealing the conduit, and making repairs to the openings in the structures shall be deemed included in the unit price bid for installation of conduit.

Other work such as pavement saw-cutting, trench excavation (including test pits as directed), temporary timber sheeting, backfilling and pavement/curb restoration shall be paid for separately under the appropriate bid items.

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- ITEM 662.1001 11 - INSTALL PRECAST CONCRETE TYPE S ELECTRIC BOX (CON EDISON)
- ITEM 662.1002 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE S ELECTRIC BOX (CON EDISON)
- ITEM 662.1003 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE DB-6 ELECTRIC BOX (CON EDISON)
- ITEM 662.1004 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M11-6 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1005 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1006 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE TS ELECTRIC SERVICE BOX (CON EDISON)
- ITEM 662.1007 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE V13 ELECTRIC VAULT (CON EDISON)
- ITEM 662.1008 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-90 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1009 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1010 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14 SINGLE 45 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1011 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-DUAL 90 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1012 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M15-90 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1013 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16-90 ELECTRIC MANHOLE (CON EDISON)

**DESCRIPTION**

Under these items, the Contractor shall provide all labor, equipment and specified materials required to install or furnish and install Con Edison cable manholes and distribution boxes at the locations indicated on the plans. The manholes shall either be constructed of precast or cast-in-place concrete as specified on the plans and detailed on the applicable Con Edison standard reference drawings for each type box and manhole indicated.

All work shall be in accordance with Con Edison requirements. Con Edison standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
Region 11 - Hunters Point Plaza  
47-40 21st Street  
Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions.

- ITEM 662.1001 11 - INSTALL PRECAST CONCRETE TYPE S ELECTRIC BOX (CON EDISON)**
- ITEM 662.1002 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE S ELECTRIC BOX (CON EDISON)**
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- ITEM 662.1011 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-DUAL 90 ELECTRIC MANHOLE (CON EDISON)**
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- ITEM 662.1013 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16-90 ELECTRIC MANHOLE (CON EDISON)**

### **MATERIALS**

A. Materials furnished by Con Edison under these items are as follows:

1. Where precast concrete type S boxes are specified on the plans, the entire precast box structure (EO-9507-B) will be furnished by Con Edison.
2. Where cast-in-place type S box, DB-6 box, TS box, type V13 vault, M11-6 and M14 manhole structures are specified on the plans, the roof slabs (EO-16820-C, EO-16820-C, EO-13333-C, EO-14819-C, EO12912-B, EO-13526-B, EO-6336-B, EO-14596-B and EO-7448-C) shall be precast concrete and will be furnished by Con Edison.
3. Con Edison will furnish miscellaneous steel and iron castings consisting of manhole/box frames and covers, floor sump gratings and pulling eyes.

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- B. All other required materials not listed in item A above shall be furnished by the Contractor, including concrete and epoxy-coated reinforcing steel for cast-in-place manholes and chimneys, grout/mortar, brick and inserts.
- C. All materials used to support, protect and maintain existing electric cables and conduit during manhole/box installation shall be supplied by the Contractor and shall be as approved by the Resident Engineer in consultation with Con Edison.
- D. All materials provided by Con Edison will be delivered to the Contractor at the construction site and unloaded by the Contractor. The Contractor shall be responsible for the loss, theft of or damage to all materials and equipment furnished by Con Edison. The Contractor shall unload all materials in such a manner as to prevent damage and shall use appropriate devices to protect pipe coatings, etc. while handling. It shall be the responsibility of the Contractor to ensure that all materials are complete and free of defects or damage upon receipt. The Contractor shall provide suitable protection from theft or damage for all materials at the construction site. If the Contractor fails to inspect

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- ITEM 662.1013 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16-90 ELECTRIC MANHOLE (CON EDISON)**

the material or accepts the material and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense.

- E. The Contractor shall submit to Con Edison at least 15 working days prior to the start of construction a detailed bill of materials required and material delivery schedule, to assure adequate time to procure all necessary materials.
- F. Excess materials furnished by Con Edison and not used in the Work shall be returned by the Contractor to the designated Con Edison storage yard for off-loading by Con Edison personnel.

### **CONSTRUCTION DETAILS**

Construction of cable manholes and distribution boxes shall be in accordance with all Con Edison reference drawings, specifications and requirements. Construction methods include the following:

- A. Testing:

- ITEM 662.1001 11 - INSTALL PRECAST CONCRETE TYPE S ELECTRIC BOX (CON EDISON)**
- ITEM 662.1002 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE S ELECTRIC BOX (CON EDISON)**
- ITEM 662.1003 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE DB-6 ELECTRIC BOX (CON EDISON)**
- ITEM 662.1004 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M11-6 ELECTRIC MANHOLE (CON EDISON)**
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- ITEM 662.1011 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-DUAL 90 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1012 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M15-90 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1013 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16-90 ELECTRIC MANHOLE (CON EDISON)**

1. Under Item 206.02 Trench Excavation, excavate to the dimensions required for existing manhole/box removal and new manhole/box construction; support existing utilities.
2. Using hand-held power tools, break out and remove the existing concrete manhole/box, supporting and protecting the existing conduit and cables; payment for this item will be made separately under Removal of Abandoned Masonry.
3. Ducts within the manhole excavation are to be exposed and carefully broken out by the Contractor in one test area and scheduled for testing by Con Edison to determine whether cables are live.

**B. Removal and Support:**

1. Where individual conduits are determined to be abandoned, empty or contain dead cable, their removal within the manhole/box excavation will be considered included under Item 206.02 Trench Excavation.

- ITEM 662.1001 11 - INSTALL PRECAST CONCRETE TYPE S ELECTRIC BOX (CON EDISON)**
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- ITEM 662.1003 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE DB-6 ELECTRIC BOX (CON EDISON)**
- ITEM 662.1004 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M11-6 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1005 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14 ELECTRIC MANHOLE (CON EDISON)**
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- ITEM 662.1013 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16-90 ELECTRIC MANHOLE (CON EDISON)**

2. Using hand-held power tools, carefully break-out, remove and dispose of all existing precast concrete, steel, iron, plastic, wooden or other ducts within the manhole excavation designated to be maintained which contain live cables. Steel or iron conduit shall be cut by the ring and snap method and removed using approved ripping tools. Where ducts are encased in concrete, the cost of breaking out, removing and disposing of the plain or reinforced concrete encasement using hand-held power tools to provide clearance for manhole/box construction will be paid for separately under Removal of Abandoned Masonry.
  3. Support and protect existing live cables as required.
- C. Manhole/Box Construction (EO-16820-C, EO-9507-B, EO-12917-B, EO-12912-B, EO-14819-C, EO-13331-B, EO-13334-B, EO-2468-B, EO-10582-A, EO-1090-B, EO-7324-B, EO-6336-B, EO-12423-B, EO-10831-B, EO-12990-B, EO-9758-B and EO-10815-B):

- ITEM 662.1001 11 - INSTALL PRECAST CONCRETE TYPE S ELECTRIC BOX (CON EDISON)**
- ITEM 662.1002 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE S ELECTRIC BOX (CON EDISON)**
- ITEM 662.1003 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE DB-6 ELECTRIC BOX (CON EDISON)**
- ITEM 662.1004 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M11-6 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1005 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14 ELECTRIC MANHOLE (CON EDISON)**
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- ITEM 662.1008 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-90 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1009 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16 ELECTRIC MANHOLE (CON EDISON)**
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- ITEM 662.1011 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-DUAL 90 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1012 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M15-90 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1013 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16-90 ELECTRIC MANHOLE (CON EDISON)**

1. Field-construct floor and walls of manhole/box around existing electric cables using field-split precast conduit bell ends (EO-9799-D, EO-1042) embedded as wall sleeves (and adapters from existing duct material to precast where appropriate). Provide for new duct entrances (EO-9508-C, EO-2603) as required. Face-off and seal ducts per EO-1100; install miscellaneous metals (EO-1898-D, EO-2086-C, EO2236-C, EO-7841-C, EO 9210-C, EO-10582-A, EO-100,133).
2. Install precast roof slab where required on Con Edison reference standards. Roof slab shall be set with minimum 675 mm cover to proposed grade (unless otherwise directed) in order to clear proposed roadway pavement subbase course.
3. Install reinforced cast-in-place concrete chimney [(EO-10321-B), Methods 4 or 6] over precast roof slabs for type S box, DB-6, M11-6 and M14 manhole structures. Install frame and cover per EO-10321-B, EO-1092, EO-100,271, EO-100,167, EO-13465-C, EO-9359-C, EO 9360-C, EO-12428-B, EO-12917-B and EO-8835-B.

- ITEM 662.1001 11 - INSTALL PRECAST CONCRETE TYPE S ELECTRIC BOX (CON EDISON)**
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- ITEM 662.1003 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE DB-6 ELECTRIC BOX (CON EDISON)**
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- ITEM 662.1008 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-90 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1009 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1010 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14 SINGLE 45 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1011 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-DUAL 90 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1012 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M15-90 ELECTRIC MANHOLE (CON EDISON)**
- ITEM 662.1013 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16-90 ELECTRIC MANHOLE (CON EDISON)**

4. For precast boxes, the installation shall include the breaking out of the precast walls for duct entrances.

D. The class of concrete and structural steel used for manhole/box construction and related structures shall be as specified on EO-1008. Waterstops shall be provided at all joints when not monolithically poured. Structural steel shall also conform to the requirements of ASTM A36. All reinforcing steel shall be epoxy-coated. Con Edison reserves the right to make minor changes to the design of structures.

#### **METHOD OF MEASUREMENT**

The quantity to be paid for under these items shall be the actual number of each manhole and box installed for the various specified types.

#### **BASIS OF PAYMENT**

The unit price bid per each manhole and box installed, for each of the scheduled types, shall include all labor, equipment and specified materials necessary to complete the work as outlined

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- ITEM 662.1001 11 - INSTALL PRECAST CONCRETE TYPE S ELECTRIC BOX (CON EDISON)
- ITEM 662.1002 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE S ELECTRIC BOX (CON EDISON)
- ITEM 662.1003 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE DB-6 ELECTRIC BOX (CON EDISON)
- ITEM 662.1004 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M11-6 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1005 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1006 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE TS ELECTRIC SERVICE BOX (CON EDISON)
- ITEM 662.1007 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE V13 ELECTRIC VAULT (CON EDISON)
- ITEM 662.1008 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-90 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1009 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1010 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14 SINGLE 45 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1011 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M14-DUAL 90 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1012 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M15-90 ELECTRIC MANHOLE (CON EDISON)
- ITEM 662.1013 11 - INSTALL CAST-IN-PLACE CONCRETE TYPE M16-90 ELECTRIC MANHOLE (CON EDISON)

herein. Other work such as pavement saw-cutting, trench excavation (including test pits as directed), temporary sheeting, backfilling and pavement/curb restoration shall be paid for separately under the appropriate bid items.

**D260298****ITEM 662.1014 11 - CAST-IN-PLACE ELECTRIC MANHOLE AS DETAILED (CON EDISON)****DESCRIPTION**

Under this item, the Contractor shall provide the necessary labor, specified materials and equipment, required to install special non-standard size cast-in-place Con Edison electrical manholes at the locations shown on the plans.

All work and materials shall be in accordance with the contract documents, Con Edison standards, specifications and requirements, and as ordered by the Engineer.

Con Edison standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
 Region 11 - Hunters Point Plaza  
 47-40 21st Street  
 Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions.

**MATERIALS**

Con Edison will furnish the cable racks, pulling eyes and embedments, sump castings, hardware, and cast iron frames and covers where indicated on the plans. Con Edison will deliver these materials to the Contractor at the construction site (Ref. EO-1898-D, EO-7841-B, EO-13465-C or EO-SK 6620, EO-9359-C and Dwg. 350129). The Contractor shall provide the structural concrete, epoxy coated reinforcing steel, roof structural steel, precast or cast-in-place chimney components, mortar and all materials necessary for cast-in-place construction of the manholes, complete in place, as detailed on the plans and Con Edison standard drawings.

Materials furnished by the Contractor shall conform to the following subsections of the NYSDOT Standard Specification:

Structural Concrete:	Section 555-2.01
Epoxy Coated Reinforcing Steel:	Section 556-2.01
Roof Structural Steel:	Section 564-2

In addition, cast-in-place concrete for manhole construction, precast or cast-in-place concrete for chimneys, and mortar shall conform to section 604-2.01.

The Contractor shall notify Con Edison of the installation schedule at least thirty days before construction. Should Con Edison fail to deliver the necessary material according to the required schedule, the State will not be responsible for any delays attributable thereto, nor for the failure

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**ITEM 662.1014 11 - CAST-IN-PLACE ELECTRIC MANHOLE AS DETAILED (CON EDISON)**

of delivery of such material.

It will be the Contractor's responsibility to inspect the materials immediately upon delivery and advise Con Edison of all damaged material. All material lost, or damaged after the Contractor's inspection has been completed, shall be replaced by the Contractor at his own cost and at no additional expense to the State.

**CONSTRUCTION DETAILS**

The installation of the manholes shall be as detailed on the plans and in accordance with Con Edison standard specifications and drawings and as directed by the Engineer.

Manhole chimneys shall be constructed in accordance with the requirements of Con Edison standard drawing EO-10321-B and Con Edison specification EO-1092.

Cable rack installation shall as directed by Con Edison's field representative and in accordance with EO-2236-C, EO-9210-C and EO-2086-C.

**METHOD OF MEASUREMENT**

The quantity to be measured under this item will be the number of cubic meters of internal volume of Con Edison electric manholes actually installed in accordance with the plans, specifications and as ordered by the Engineer.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of all labor, specified materials, and equipment necessary, to complete the work. Payment for excavation, backfill and sheeting, in connection with manhole construction, will be made separately under the appropriate items.

Where replacement manholes are indicated on the plans, work under this item shall also include the protection of existing cables and splices. Demolition and removal of existing manhole structures will be paid separately under Item 662.80 11 – Removal of Abandoned Masonry (Con Edison).

<b>ITEM 662.2016</b>	<b>11</b>	<b>-</b>	<b>INSTALL 16 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2012</b>	<b>11</b>	<b>-</b>	<b>INSTALL 12 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2008</b>	<b>11</b>	<b>-</b>	<b>INSTALL 8 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2006</b>	<b>11</b>	<b>-</b>	<b>INSTALL 6 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2004</b>	<b>11</b>	<b>-</b>	<b>INSTALL 4 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2003</b>	<b>11</b>	<b>-</b>	<b>INSTALL 3 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>

### **DESCRIPTION**

Under this section, the Contractor shall provide all labor, equipment and all materials not supplied by Con Edison necessary to install, clean, test and place into satisfactory service new plastic gas mains, tracer wire, tracer wire termination boxes and appurtenances, complete, as specified herein and as indicated on the contract drawings in accordance with the specifications and directions of the Engineer, in consultation with the Con Edison field representative.

All work shall be in accordance with Con Edison Requirements. Con Edison standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
 Region 11- Hunters Point Plaza  
 47-20 21st Street  
 Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions in effect at the time of bidding.

### **MATERIALS**

- A. All materials will be provided by Con Edison unless specifically noted otherwise. All materials provided by Con Edison will be delivered to the Contractor at the construction site and unloaded by the Contractor. The Contractor shall provide suitable protection and be responsible for the loss, theft of or damage to all materials and equipment furnished by Con Edison. The Contractor shall unload all materials in such a manner as to prevent damage of any kind and shall use appropriate devices to protect pipe, valves etc. while handling. It shall be the responsibility of the Contractor to ensure that all materials are complete and free of defects or damage upon receipt. If the Contractor fails to inspect the material or accepts the material as is, and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense.

The Contractor shall submit to the Engineer and Con Edison at least 30 days prior to the start of gas main construction a detailed bill of materials and a material delivery schedule to assure adequate time to procure all necessary materials.

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<u>ITEM 662.2016</u>	<u>11</u>	<u>-</u>	<u>INSTALL 16 NPS POLYETHYLENE GAS MAIN</u> <u>(CON EDISON)</u>
<u>ITEM 662.2012</u>	<u>11</u>	<u>-</u>	<u>INSTALL 12 NPS POLYETHYLENE GAS MAIN</u> <u>(CON EDISON)</u>
<u>ITEM 662.2008</u>	<u>11</u>	<u>-</u>	<u>INSTALL 8 NPS POLYETHYLENE GAS MAIN</u> <u>(CON EDISON)</u>
<u>ITEM 662.2006</u>	<u>11</u>	<u>-</u>	<u>INSTALL 6 NPS POLYETHYLENE GAS MAIN</u> <u>(CON EDISON)</u>
<u>ITEM 662.2004</u>	<u>11</u>	<u>-</u>	<u>INSTALL 4 NPS POLYETHYLENE GAS MAIN</u> <u>(CON EDISON)</u>
<u>ITEM 662.2003</u>	<u>11</u>	<u>-</u>	<u>INSTALL 3 NPS POLYETHYLENE GAS MAIN</u> <u>(CON EDISON)</u>

B. The following Con Edison Standards apply to all materials:

1. Specifications:

G-8104 : Polyethylene Pipe and Fittings for Gas Mains and Services  
G-100,285 : Compression End Couplings, Tees, Elbows, Line Caps and  
Riser Tees for Gas Pipe and Tubing.

2. Drawings:

EO-16260-B : Plastic Curb Valve Box With Cast Iron Collar, 838 mm  
Extension.  
EO-4067-G : Precast Concrete Cover for Curb Valve Box in Sidewalk.  
EO-4070-C : Cover for Curb Valve Box Located in the Street.  
EO-13987-B : Temporary Locking Device for Cast Iron Curb Gas Valve  
Box.  
EO-14021-D : Plastic Cover Plate for Gas Valve Boxes.  
EO-19241-D : Base for .75 NPS thru 2 NPS Plastic Valves and 1.5 NPS  
and 2 NPS Steel Valves Used on Gas Mains and Services.  
EO-4019-C : Street Valve Box  
EO-4044-C : Cast Iron Curb Valve Box 610 mm Extension- Type CV24.  
EO-4045-C : Cast Iron Curb Valve Box 800 mm Extension- Type CV32.  
EO-5102-D : Precast Concrete Base for Street Valve Box  
EO-5315-D : Bed Blocks and Wedges for Laying Gas Pipe  
EO-6799-C : Protective Covers for Gas Main Installations.

C. The Contractor shall provide necessary fittings and gauges for pressure testing and shall provide all pressurizing equipment (air compressors, hoses, tools, test medium and similar items) for testing the new main assemblies.

D. Tracer wire shall be No. 14 red coated copper wire.

E. Protection Plate: 10 mm type A36 steel.

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<b>ITEM 662.2012</b>	<b>11</b>	<b>-</b>	<b>INSTALL 12 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2008</b>	<b>11</b>	<b>-</b>	<b>INSTALL 8 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2006</b>	<b>11</b>	<b>-</b>	<b>INSTALL 6 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2004</b>	<b>11</b>	<b>-</b>	<b>INSTALL 4 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2003</b>	<b>11</b>	<b>-</b>	<b>INSTALL 3 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>

**CONSTRUCTION DETAILS:**

A. Installation of pipe, fittings, valves, etc. shall be at the locations and depths shown on the Drawings, or as directed by the Engineer, in accordance with EO-14837-B and the following Con Edison Standards:

1. Specifications:

SPEC. 900	:	Installing Gas Mains, Regulator Stations and Services-New York City and Westchester county
IP-26	:	Installation of Central Plastics' Electrofusion Molded Fittings on Plastic Pipe/Tubing Using the Central Plastics' Control Unit
IP-27	:	Installation of Central Plastics and Frialen Electrofusion Molded Fittings on Plastic Pipe/Tubing Using Either the Central Plastics or Friatec Universal Control Unit
G-8005	:	General Specification for the Installation of Gas Distribution Mains.
G-8100	:	General Specification for the Installation of Gas Services.
G-8121	:	Qualification of Installers Performing Heat Fusion or Electrofusion of Polyethylene Pipe/Tubing for Gas Mains and Services.
G-8122	:	Transportation, Handling and Storage of Polyethylene Plastic Pipe and Fittings for Gas Mains and Services
G-8123	:	Heat Fusion Joining of Polyethylene Plastic Pipe and Fittings for Gas Mains and Services
G-8129	:	Purging Gas Mains, Services and Regulator Stations.
G-8178	:	Shut-off of Polyethylene Plastic Pipe Used for Gas Mains and Services.
G-8194	:	Street Opening Color Coding, Permit Signs at Worksite and Pavement Restoration Markers
G-8199	:	Qualification Procedure for Personnel Who Join Plastic/Tubing With Mechanical Couplings/Fittings.

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<b>ITEM 662.2012</b>	<b>11</b>	<b>-</b>	<b>INSTALL 12 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2008</b>	<b>11</b>	<b>-</b>	<b>INSTALL 8 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2006</b>	<b>11</b>	<b>-</b>	<b>INSTALL 6 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2004</b>	<b>11</b>	<b>-</b>	<b>INSTALL 4 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2003</b>	<b>11</b>	<b>-</b>	<b>INSTALL 3 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>

2. Drawings:

- EO-13911-B : Installation of 6 NPS-30 NPS Weld End Ball Valve and Valve Box for H.P. Gas Mains.
- EO-14620-C : Segmenting Long Radius Forged Elbows
- EO-16641-A : Installation of Plastic Gas Service Piping.
- EO-16954-B : Sheeting for Trenches and Excavations.
- EO-15636-C : Field Fabricated Extension for Gas Valve Installations over 1.2 meters of cover.

Direct buried plastic pipe shall have No. 14 coated copper (tracer) wire taped to the pipe at 6 to 9 meter intervals. Tracer wire shall be terminated in a valve box near intersecting streets, at locations indicated on the plans but at intervals not to exceed 150 meters.

Trenching and excavation shall be done at the required locations and to the required depths shown on the Drawings or as directed by the Engineer, in accordance with Con Edison Standards for sheeting and excavation. No change in location or grade of the new gas main shall be made without written approval of the Engineer.

The trench shall be cleaned before installation of pipe and maintained until backfill is completed. All debris, rubble and stones are to be removed on a daily basis.

The Contractor shall thoroughly clean each pipe length and fitting to remove all internal dirt and foreign matter before the pipe is lowered into the trench. This cleaning operation shall not be conducted on more than four pipe lengths or fittings ahead of the laying of the pipe. The Contractor shall also inspect and clean out, if necessary, each pipe length and elbow in the trench immediately before joining up to the installed pipe.

At the close of each day's work, or whenever work is to be suspended for any length of time, the Contractor shall securely close all open pipe ends with end caps to be furnished by Con Edison. End caps shall not be removed until the work is resumed. All end caps shall be installed in such a manner that they cannot become accidentally loosened or removed, and any obstructions entering into or remaining in the line shall be removed at the expense of the Contractor.

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<b>ITEM 662.2012</b>	<b>11</b>	<b>-</b>	<b>INSTALL 12 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2008</b>	<b>11</b>	<b>-</b>	<b>INSTALL 8 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2006</b>	<b>11</b>	<b>-</b>	<b>INSTALL 6 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2004</b>	<b>11</b>	<b>-</b>	<b>INSTALL 4 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2003</b>	<b>11</b>	<b>-</b>	<b>INSTALL 3 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>

The minimum clearance between the new mains and other subsurface structures shall be 150 mm for less than 862 kPag mains. Clearance of less than 150 mm is unacceptable without written approval of the Engineer. Should the Engineer give such approval, in no case shall the clearance be less than 50 mm and the main must be padded with plastic mesh type rockshield.

Bends in plastic pipe can be made by the use of molded elbows or by manually bending the pipe in accordance with the limits given in Specification G-8005.

All non-plastic bends shall conform to Specification G-8005. Miter bends are allowed up to 45 deg. on low pressure pipe. Miter bends greater than 3 deg. must be radiographically inspected.

All joints on plastic pipe shall be heat fused or made with mechanical couplings. Only personnel qualified in accordance with G-8121, "Qualification of Installers Performing Heat Fusion or Electrofusion of Polyethylene Plastic Pipe/Tubing for Gas Mains and Services.", and G-8199, "Qualification Procedure for Personnel Who Join Plastic Pipe/Tubing with Mechanical Couplings/Fittings."

#### B. Installation of Fittings

Fittings shall be defined as couplings, forged fittings, valves, insulating joints, weld end caps and weldolets.

Forged fittings where applicable shall be used for all high pressure pipe bends greater than 12.5 degrees.

All forged bends shall conform to Con Edison Specification G-100, 281, "Welded Forged Fittings for Gas Piping".

Bends other than standard (90 deg., 45 deg. and 22-½ deg.) shall be cut from forged fittings in accordance with Con Edison Specification EO-14620-C.

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<b>ITEM 662.2012</b>	<b>11</b>	<b>-</b>	<b>INSTALL 12 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2008</b>	<b>11</b>	<b>-</b>	<b>INSTALL 8 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2006</b>	<b>11</b>	<b>-</b>	<b>INSTALL 6 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2004</b>	<b>11</b>	<b>-</b>	<b>INSTALL 4 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2003</b>	<b>11</b>	<b>-</b>	<b>INSTALL 3 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>

Weld end insulating joints shall be welded into the line by the Contractor where specified on the drawings.

Prior to installation, each insulating joint shall be checked with a continuity tester by Con Edison. The insulating joint shall not be installed until the Contractor has verified with the Con Edison Field Representative that the continuity test is acceptable.

The cost for testing the insulation joint shall be included in the unit price for the appropriate size of gas main.

C. Pressure Testing Inerting:

The newly completed gas main shall be subjected to a combination strength-proof and leakage test by the Contractor in accordance with G-8204. The test shall be a pressure drop shut-in test with no drop in pressure permitted.

The Contractor shall give the Con Edison Field Representative three (3) weekdays notice of intent to pressure test the pipeline.

The Contractor shall furnish all material, transportation and equipment, including gas and air necessary to perform the complete pressure testing and inerting operations, including the equipment used to record the test. Inerting shall be defined as the process of displacing air or natural gas in a facility with an inert gas.

The Contractor shall provide personnel for the duration of the tests including stabilization periods, to continuously observe the recordings and protect the equipment and valve arrangements.

Dished-head weld end caps shall be welded at each end of the piping. Compression type end caps or flat plates welded over the pipe ends shall not be used.

All personnel are to remain out of the trench during pressure testing operations.

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<b>ITEM 662.2012</b>	<b>11</b>	<b>-</b>	<b>INSTALL 12 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2008</b>	<b>11</b>	<b>-</b>	<b>INSTALL 8 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2006</b>	<b>11</b>	<b>-</b>	<b>INSTALL 6 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2004</b>	<b>11</b>	<b>-</b>	<b>INSTALL 4 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>
<b>ITEM 662.2003</b>	<b>11</b>	<b>-</b>	<b>INSTALL 3 NPS POLYETHYLENE GAS MAIN (CON EDISON)</b>

The Contractor shall be responsible for locating and repairing any leaks indicated by the pressure tests. If a repair is required, the complete cycle of pressure testing shall be repeated at the Contractor's expense.

The Contractor shall install test connections as indicated on the drawings and EO-5261-C, "High Hats for Plugs and Nipples on 6 NPS – 30 NPS Steel Gas Mains 13.8 – 2413.2 kPa".

The pressure test shall be measured using two pressure gauges, deadweight gauges furnished by the Contractor and approved by Con Edison's field representative. Continuous readings will be recorded on a visible chart.

The Contractor shall install a weatherproof shelter around the gauges and recording charts when directed by the Con Edison Field Representative.

- D. All exposed coated steel gas mains where the coating is found damaged shall be cleaned and the coating shall be replaced in kind in accordance with Specification G-8062.
- E. Magnesium anodes and test stations shall be installed at the locations shown on the plans or directed by the Engineer. Con Edison will supply thermit weld equipment. All test lead wires shall be tested by Con Edison's Corrosion Survey Section before backfilling.

**METHOD OF MEASUREMENT:**

The quantity to be paid for under these items shall be the actual number of linear meters installed for each pipe size, as measured along the center line of the pipe in its final position.

**BASIS OF PAYMENT:**

The unit price bid per linear meter shall include the cost of all labor and equipment and materials not provided by Con Edison as necessary to complete the work. The price per linear meter of polyethylene gas main shall include pipe installation, cutting of pipe, joining by heat fusion or mechanical couplings, installation of fittings, adapters and castings, tracer wires, termination boxes installation of magnesium anodes, repair of damaged pipe coatings and testing and inerting. Other work such as pavement saw-cutting, trench excavation, temporary timber

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- ITEM 662.2016 11 - INSTALL 16 NPS POLYETHYLENE GAS MAIN  
(CON EDISON)
- ITEM 662.2012 11 - INSTALL 12 NPS POLYETHYLENE GAS MAIN  
(CON EDISON)
- ITEM 662.2008 11 - INSTALL 8 NPS POLYETHYLENE GAS MAIN  
(CON EDISON)
- ITEM 662.2006 11 - INSTALL 6 NPS POLYETHYLENE GAS MAIN  
(CON EDISON)
- ITEM 662.2004 11 - INSTALL 4 NPS POLYETHYLENE GAS MAIN  
(CON EDISON)
- ITEM 662.2003 11 - INSTALL 3 NPS POLYETHYLENE GAS MAIN  
(CON EDISON)

sheeting, backfilling with granular materials, compacting, valve installation, protection plates and pavement/curb restoration shall be paid for separately under the appropriate bid item.

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<b>ITEM 662.37</b>	<b>11 - INSTALL 6 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3701</b>	<b>11 - INSTALL 12 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3702</b>	<b>11 - INSTALL 8 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3703</b>	<b>11 - INSTALL 16 NPS MAINLINE VALVE (CON EDISON)</b>

**DESCRIPTION**

Under this section, the Contractor shall provide all labor, equipment and all materials not supplied by Con Edison necessary to install, clean, test and place into satisfactory service new plastic gas mainline valve assemblies, complete, as specified herein and as indicated on the contract drawings in accordance with the specifications and directions of the Engineer, in consultation with the Con Edison field representative.

All work shall be in accordance with Con Edison requirements. Con Edison standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
 Region 11 - Hunters Point Plaza  
 47-40 21st Street  
 Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions in effect at the time of bidding.

**MATERIALS**

- A. All materials will be provided by Con Edison unless specifically noted otherwise. All materials provided by Con Edison will be delivered to the Contractor at the construction site and unloaded by the Contractor. The Contractor shall provide suitable protection and be responsible for the loss, theft of or damage to all materials and equipment furnished by Con Edison. The Contractor shall unload all materials in such a manner as to prevent damage of any kind and shall use appropriate devices to protect pipe, valves etc. while handling. It shall be the responsibility of the Contractor to ensure that all materials are complete and free of defects or damage upon receipt. If the Contractor fails to inspect the material or accepts the material as is, and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense.

The Contractor shall submit to Con Edison at least 30 days prior to the start of gas main construction, a detailed bill of materials and a material delivery schedule to assure adequate time to procure all necessary materials.

- B. The following Con Edison Standards apply to all materials:

1. Specifications:
 

G-8104	:	Polyethylene Pipe and Fittings for Gas Mains and Services
G-100,075	:	Valves

<b>ITEM 662.37</b>	<b>11</b>	<b>- INSTALL 6 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3701</b>	<b>11</b>	<b>- INSTALL 12 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3702</b>	<b>11</b>	<b>- INSTALL 8 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3703</b>	<b>11</b>	<b>- INSTALL 16 NPS MAINLINE VALVE (CON EDISON)</b>

2. Drawings:
- EO-4019-C : Street Valve Box
  - EO-4044-C : Cast Iron Curb Valve Box 610 mm Extension- Type CV24.
  - EO-4045-C : Cast Iron Curb Valve Box 800 mm Extension- Type CV32.
  - EO-4067-G : Precast Concrete Cover for Curb Valve Box in Sidewalk.
  - EO-4070-C : Cover for Curb Valve Box Located in the Street.
  - EO-5102-D : Precast Concrete Base for Street Valve Box
  - EO-5315-D : Bed Blocks and Wedges for Laying Gas Pipe
  - EO-13987-B : Temporary Locking Device for Cast Iron Curb Gas Valve Box.
  - EO-14021-D : Plastic Cover Plate for Gas Valve Boxes.
  - EO-15220-B : Plastic Pipe Sleeve and Cover
  - EO-15636-C : Valve Stem Pipe with Lubrication Fitting
  - EO-16260-B : Plastic Curb Valve Box With Cast Iron Collar, 838 mm Extension.
  - EO-19241-D : Base for .75 NPS thru 2 NPS Plastic Valves and 1.5 NPS and 2 NPS Steel Valves Used on Gas Mains and Services.
  - EO-6799-C : Protective Covers for Gas Main Installations.

### CONSTRUCTION DETAILS

- A. Installation of the valves shall be at the locations and depths shown on the Drawings, or as directed by the Engineer, in accordance with the following Con Edison Standards:
1. Specifications:
- SPEC. 900 : Installing Gas Mains, Regulator Stations and Services-New York City and Westchester county
  - IP-26 : Installation of Central Plastics' Electrofusion Molded Fittings on Plastic Pipe/Tubing Using the Central Plastics' Control Unit
  - IP-27 : Installation of Central Plastics and Frialen Electrofusion Molded Fittings on Plastic Pipe/Tubing Using Either the Central Plastics or Friatec Universal Control Unit
  - 309808 : Installation of 8" & 12" Polyethylene Gas Valves
  - G-8005 : General Specification for the Installation of Gas Distribution Mains.
  - G-8100 : General Specification for the Installation of Gas Services.

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<b>ITEM 662.37</b>	<b>11</b>	<b>- INSTALL 6 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3701</b>	<b>11</b>	<b>- INSTALL 12 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3702</b>	<b>11</b>	<b>- INSTALL 8 NPS MAINLINE VALVE (CON EDISON)</b>
<b>ITEM 662.3703</b>	<b>11</b>	<b>- INSTALL 16 NPS MAINLINE VALVE (CON EDISON)</b>

- G-8121 : Qualification of Installers Performing Heat Fusion or Electrofusion of Polyethylene Pipe for Gas Mains and Services.
- G-8122 : Transportation, Handling and Storage of Polyethylene Plastic Pipe and Fittings for Gas Mains and Services
- G-8123 : Heat Fusion Joining of Polyethylene Plastic Pipe and Fittings for Gas Mains and Services
- G-8129 : Purging Gas Mains, Services and Regulator Stations.
- G-8178 : Shut-off of Polyethylene Plastic Pipe Used for Gas Mains and Services.
- G-8194 : Street Opening Color Coding, Permit Signs at Worksite and Pavement Restoration Markers
- G-8199 : Qualification Procedure for Personnel Who Join Plastic Pipe With Mechanical Couplings
2. Drawings:
- EO-16641-A : Installation of Plastic Gas Service Piping.
- EO-13911-B : Installation of 6 NPS-30 NPS Weld End Ball Valve and Valve Box for H.P. Gas Mains.
- EO-14620-C : Segmenting Long Radius Forged Elbows
- EO-16954-B : Sheeting for Trenches and Excavations.
- EO-15636-C : Field Fabricated Extension for Gas Valve Installations over 1.2 meters of cover.

The Contractor shall install valves at the locations and depth shown on the drawings and as specified herein:

Prior to installation, all valves shall be operated from the extreme open position to the closed position and back to the open position. This test is to be performed by a designated valve maintenance mechanic from Con Edison's Gas Division and witnessed by the Engineer.

All lubricated plug valves shall be lubricated in the full open position by the Con Edison Gas Division Mechanic both prior to operations as described above and subsequent to the installation of the valve.

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<u>ITEM 662.37</u>	<u>11 - INSTALL 6 NPS MAINLINE VALVE (CON EDISON)</u>
<u>ITEM 662.3701</u>	<u>11 - INSTALL 12 NPS MAINLINE VALVE (CON EDISON)</u>
<u>ITEM 662.3702</u>	<u>11 - INSTALL 8 NPS MAINLINE VALVE (CON EDISON)</u>
<u>ITEM 662.3703</u>	<u>11 - INSTALL 16 NPS MAINLINE VALVE (CON EDISON)</u>

For ball valves, the dust caps on the emergency lubricating fittings are to be removed by the Con Edison Gas Division Mechanic and the fitting alone greased lightly (the valve body itself shall not be greased). Following this, replace the dust cap and check for tightness.

All ball valves shall be installed by the Contractor in accordance with Con Edison Drawing EO-13911-B in the open position, and shall remain in the open position and uncoated until after the pressure test.

Extreme care shall be taken to prevent debris or weld splatter from damaging the seats of the valves. The insides of all valves shall be carefully swabbed upon completion of the initial weld to the line.

The Contractor is to remove the steel drain plug and replace it with a special body vent plug supplied with the valve as per EO-13911-B on Grove ball valves only.

The Contractor shall provide brick support for new valve as required, and shall fabricate and install the protector pipe assembly and install the valve box and precast concrete base.

Where a valve is installed with greater than 1.2 meters of cover, the Contractor shall fabricate and install an extension in accordance with EO-15636-C.

**METHOD OF MEASUREMENT**

The quantity to be paid for under this item shall be for each valve assembly installed.

**BASIS OF PAYMENT**

The unit price bid for each valve assembly shall include the cost of all labor and equipment and materials not provided by Con Edison as necessary to complete the work. The price per each valve assembly shall include valve installation, cutting of pipe, joining of pipe to the valve by heat fusion or mechanical couplings, valve box, adapters, castings, brick supports as required and precast concrete base all as shown on the plans and Con Edison Standard EO-13911-B. Other work such as excavation, sheeting, backfilling with granular materials and compacting shall be paid for separately under the appropriate bid item.

**ITEM 662.38      11 - INSTALL POLYETHYLENE HOUSE SERVICE PIPING**  
**(CON EDISON)**

**DESCRIPTION:**

Under this section, the Contractor shall provide all labor, equipment and all materials not supplied by Con Edison necessary to install, clean, test, and place into satisfactory service new polyethylene house service piping, curb valves, valve boxes, tracer wire and appurtenances, complete as specified herein and as indicated on the contract drawings in accordance with the specifications and directions of the Engineer, in consultation with the Con Edison field representative.

All work shall be in accordance with Con Edison requirements. Con Edison standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
 Region 11 - Hunters Point Plaza  
 47-20 21st Street  
 Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions in effect at the time of bidding.

**MATERIALS:**

- A. All materials will be provided by Con Edison unless specifically noted otherwise. All materials provided by Con Edison will be delivered to the Contractor at the construction site and unloaded by the Contractor. The Contractor shall provide suitable protection and be responsible for the loss, theft of or damage to all materials and equipment furnished by Con Edison. The Contractor shall unload all materials in such a manner as to prevent damage of any kind and shall use appropriate devices to protect pipe, valves etc. while handling. It shall be the responsibility of the Contractor to ensure that all materials are complete and free of defects or damage upon receipt. If the Contractor fails to inspect the materials or accepts the material as is, and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense.

The Contractor shall submit to Con Edison at least 30 working days prior to the start of gas main construction, he shall submit a detailed bill of materials and a material delivery schedule to assure adequate time to procure all necessary materials.

- B. The following Con Edison Standards apply to all materials:

1. Specifications:
  - G-8104 : Polyethylene Pipe and Fittings for Gas Mains and Services.
  - G-100,285 : Compression End Couplings, Tees, Elbows, Line Caps and Riser Tees for Gas Pipe and Tubing.
  - G-100,075 : Valves

**ITEM 662.38      11 - INSTALL POLYETHYLENE HOUSE SERVICE PIPING**  
**(CON EDISON)**

2. Drawings:
- EO-16260-B : Plastic Curb Valve Box With Cast Iron Collar, 838 mm Extension.
  - EO-4067-G : Precast Concrete Cover for Curb Valve Box in Sidewalk.
  - EO-4070-C : Cover for Curb Valve Box Located in the Street.
  - EO-13987-B : Temporary Locking Device for Cast Iron Curb Gas Valve Box.
  - EO-14021-D : Plastic Cover Plate for Gas Valve Boxes.
  - EO-15220-B : Plastic Pipe Sleeve and Cover
  - EO-19241-D : Base for 19 mm thru 51 mm Plastic Valves and 38 mm and 51 mm Steel Valves Used on Gas Mains and Services.
  - EO-4019-C : Street Valve Box
  - EO-4044-C : Cast Iron Curb Valve Box 610 mm Extension - Type CV24.
  - EO-4045-C : Cast Iron Curb Valve Box 800 mm Extension- Type CV32.
  - EO-5102-D : Precast Concrete Base for Street Valve Box
  - EO-5315-D : Bed Blocks and Wedges for Laying Gas Pipe
  - EO-6799-C : Protective Covers for Gas Main Installations.

- C. The Contractor shall provide necessary fittings and gauges for pressure testing and shall provide all pressurizing equipment (air compressors, hoses, tools and similar items) for testing the new house connection assemblies.
- D. Tracer wire shall be No. 14 red coated copper wire.
- E. Protection Plate: 10 mm type A36 steel.

**CONSTRUCTION DETAILS:**

- A. Installation of pipe, fittings, valves, etc. shall be at the locations and depths shown on the drawings, or as directed by the Engineer, in accordance with EO-14837-B and the following Con Edison Standards:
1. Specifications:
- SPEC. 900: Installing Gas Mains, Regulator Stations and Services-New York City and Westchester County
  - IP-26: Installation of Central Plastics' Electrofusion Molded Fittings on Plastic Pipe/Tubing Using the Central Plastics' Control Unit
  - IP-27: Installation of Central Plastics and Frialen Electrofusion Molded Fittings on Plastic Pipe/Tubing Using Either the Central Plastics or Friatec Universal Control Unit
  - 309808: Installation of 8" & 12" Polyethylene Gas Valves
  - G-8005: General Specification for the Installation of Gas Distribution Mains.
  - G-8100: General Specification for the Installation of Gas Services.
  - G-8121: Qualification of Installers Performing Heat Fusion or Electrofusion of Polyethylene Pipe/Tubing for Gas Mains and Services.

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(CON EDISON)**

- G-8122: Transportation, Handling and Storage of Polyethylene Plastic Pipe and Fittings for Gas Mains and Services
  - G-8123: Heat Fusion Joining of Polyethylene Plastic Pipe and fittings for Gas Mains and Services
  - G-8129: Purging Gas Mains, Services and Regulator Stations.
  - G-8178: Shut-off of Polyethylene Plastic Pipe Used for Gas Mains and Services.
  - G-8194: Street Opening Color Coding, Permit Signs at Worksite and Pavement Restoration Markers
  - G-8199: Qualification Procedure for Personnel Who Join Plastic Pipe/Tubing with Mechanical Couplings/Fittings.
2. Drawings:
- EO-13911-B: Installation of 6 NPS-30 NPS Weld End Ball Valve and Valve Box for H.P. Gas Mains.
  - EO-14620-C: Segmenting Long Radius Forged Elbows
  - EO-15636-C: Field Fabricated Extension for Gas Valve Installations over 1.2 meters of cover.
  - EO-16641-A: Installation of Plastic Gas Service Piping
  - EO-16954-B: Sheeting for Trenches and Excavations

New curb valves indicated on the plans shall be installed per Con Edison requirements; payment included under this item.

Direct buried plastic pipe shall have No. 14 red coated copper (tracer) wire taped to the pipe at 6 to 9 meter intervals. Tracer wire shall be terminated in new or existing curb valve box (as indicated or plans).

Trenching and excavation shall be made in the required locations and to the required depths shown on the Drawings or as directed by the Engineer, in accordance with Con Edison Standards for sheeting and excavation. No change in location or grade of the new gas service shall be made without approval of the Engineer.

The trench shall be cleaned before installation of pipe and maintained until backfill is completed. All debris, rubble and stones are to be removed on a daily basis.

The Contractor shall thoroughly clean each pipe length and fitting to remove all internal dirt and foreign matter before the pipe is lowered into the trench. This cleaning operation shall not be conducted on more than four pipe lengths or fittings ahead of the laying of the pipe. The Contractor shall also inspect and clean out, if necessary, each pipe length and elbow in the trench immediately before joining up to the installed pipe.

**ITEM 662.38    11 - INSTALL POLYETHYLENE HOUSE SERVICE PIPING**  
**(CON EDISON)**

At the close of each day's work, or whenever work is to be suspended for any length of time, the Contractor shall securely close all open pipe ends with end caps to be furnished by Con Edison. End caps shall not be removed until the work is resumed.

All end caps shall be installed in such a manner that they cannot become accidentally loosened or removed, and any obstructions entering into or remaining in the line shall be removed at the expense of the Contractor.

Prior to installation, all valves shall be operated from the extreme open position to the closed position and back to the open position. This test is to be performed by a designated valve maintenance mechanic from Con Edison's Gas Division and witnessed by the Engineer.

**B. Pressure Testing/Inerting**

The newly completed house service piping shall be subjected to a combination strength-proof and leakage test by the Contractor in accordance with G-8204. The test shall be a pressure drop shut-in test with no drop in pressure permitted.

The Contractor shall give the Con Edison Field Representative three (3) weekdays notice of intent to pressure test the pipeline.

The Contractor shall furnish all material, transportation and equipment, including inert gas and air necessary to perform the complete pressure testing and inerting operations, including the equipment used to record the test. Inerting shall be defined as the process of displacing air or natural gas in a facility with an inert gas.

The Contractor shall provide personnel for the duration of the tests including stabilization periods, to observe the recordings and protect the equipment and valve arrangements.

All personnel are to remain out of the trench during pressure testing operations.

The Contractor shall be responsible for locating and repairing any leaks indicated by the pressure tests. If a repair is required, the complete cycle of pressure testing shall be repeated at the Contractor's expense.

The pressure test shall be measured using two pressure gauges, furnished by the Contractor approved by Con Edison's field representative.

The Contractor shall install a weatherproof shelter around the gauges when directed by the Con Edison Field Representative.

**ITEM 662.38      11 - INSTALL POLYETHYLENE HOUSE SERVICE PIPING**  
**(CON EDISON)**

**METHOD OF MEASUREMENT:**

The quantity to be paid for under this item shall be for each polyethylene house service piping-run installed.

**BASIS OF PAYMENT:**

The unit price bid for each polyethylene house service piping-run shall include the cost of all labor and equipment and materials not provided by Con Edison as necessary to complete the work. The price for each service run shall include pipe installation, cutting of pipe, joining by heat fusion or mechanical couplings, installation of fittings, adapters, valves and castings, tracer wire and testing and inerting. Other work such as pavement saw-cutting, trench excavation, temporary timber sheeting, backfilling with granular materials, compacting and pavement/curb restoration shall be paid for separately under the appropriate bid item.

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**ITEM 662.40015011 - INSTALL 1.5 NPS PLASTIC PIPE CONDUIT (ECS)**  
**ITEM 662.4002 11 - INSTALL 2 NPS PLASTIC PIPE CONDUIT (ECS)**  
**ITEM 662.4004 11 - INSTALL 4 NPS PLASTIC PIPE CONDUIT (ECS)**

**DESCRIPTION**

Under this item, the Contractor shall install 1.5 NPS, 2 NPS or 4 NPS PVC telephone conduit as specified herein and as indicated on the contract plans or as directed by the Engineer. The work shall include installing the conduit, connections, adaptors and all fittings required and encasing the conduit in concrete.

All work shall be in accordance with Empire City Subway (ECS) requirements. ECS standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
Region 11 - Hunters Point Plaza  
47-40 21st Street  
Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions.

**MATERIALS**

Conduit and fittings will be furnished in commercial lengths by ECS and delivered by ECS to the Contractor at the construction site. The Contractor shall furnish all materials for the coating, joining, spacing or temporary support of the conduit and fittings.

The Contractor is to notify the utility company at least one month before the material is required at the site. It shall be the Contractor's responsibility to immediately inspect the material during delivery and advise the company of any damaged or inappropriate material. If the Contractor fails to inspect the material during delivery or accepts the material and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense. Excess materials furnish by ECS and not used in the work shall be returned by the Contractor to a designated ECS storage yard for off-loading by ECS personnel.

Concrete for encasement of the conduits shall be Class 2500 as specified in Section 622-020-901 of the New York Telephone Subsurface Plant Handbook (NYT SSP Handbook) and shall achieve a compressive strength of 17,250 kPa at 28 days. Duct plugs where called for on the drawings shall be the 1.5 NPS or 4 NPS universal duct plug in accordance w/Section 622-200-205 of the NYTSSP Handbook.

**CONSTRUCTION DETAILS:**

PVC conduit shall be installed in accordance with Section 662-340-200 of the NYT SSP Handbook specifications and drawings as required. Before entering any existing manhole with new ducts, the Contractor must contact ECS, request and receive approval for a location for the

**ITEM 662.40015011 - INSTALL 1.5 NPS PLASTIC PIPE CONDUIT (ECS)**  
**ITEM 662.4002 11 - INSTALL 2 NPS PLASTIC PIPE CONDUIT (ECS)**  
**ITEM 662.4004 11 - INSTALL 4 NPS PLASTIC PIPE CONDUIT (ECS)**

Point of Entry from ECS. No conduit is allowed to enter an ECS manhole through the chimney or roof slab.

Ducts entering the manholes shall be terminated at 25 mm from the inside of the manhole wall. All ducts shall be left with a 10 mm polypropylene rope inside with sufficient length to attach a mandrel.

Concrete shall have a maximum aggregate size of 7 mm and an average slump of 225 mm.

A duct rodding device shall be passed through the completed ducts to check for continuity and cleanliness. Following the duct rodding, a 92 mm mandrel, as illustrated in Section 622-340-200 of the NYT SSP Handbook, preceded by a wire brush tied to the polypropylene rope of a size not less than 10 mm, shall be passed through the new conduit.

#### **METHOD OF MEASUREMENT**

The quantity to be paid for will be the number of meters of 1.5 NPS, 2 NPS or 4 NPS PVC conduit installed, measured along the axis of the pipe in its final position.

#### **BASIS OF PAYMENT**

The unit price bid per meter shall include the cost of all labor and equipment to install the PVC conduit including, but not limited to, all fittings, adaptors and connections and concrete encasement necessary to complete the work. Any excavation and backfill required shall be paid for separately under the appropriate bid items. Where the location of duct construction or replacement is beyond the pavement replacement limits shown on the drawings or ordered by the Engineer, the Contractor shall be paid for any sawcutting, excavation, backfill and pavement restoration under their respective pay items.

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**ITEM 11662.42 M - INSTALL CONCRETE ENCASED SPLIT PVC TELEPHONE CONDUIT (ECS)**

**Description:**

Under this item, the Contractor shall provide all labor, materials not supplied by ECS, equipment and incidentals required to adjust the horizontal and/or vertical alignment of telephone duct facilities by breaking existing ducts, shifting and supporting active cable in new alignment, installing split 89 or 102 mm PVC duct and encasement as shown on plans.

The adjustment work shall be performed at the locations shown on the plans or as directed, to avoid interferences with the proposed sewer/water, catch basins and connection pipes or other work, in accordance with the specifications.

All work shall be in accordance with ECS requirements. ECS standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
Region 11 - Hunters Point Plaza  
47-40 21st Street  
Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions.

**Materials:**

Split PVC conduit, conduit adapters and appurtenances will be supplied by ECS and delivered by ECS to the Contractor at the construction site. Concrete for encasement of the conduits shall be Class 2500 as specified in Section 622-020-901 of the New York Telephone Subsurface Plant Handbook (NYT SSP Handbook) and shall achieve a compressive strength of 17,250 kPa at 28 days.

The Contractor shall submit to ECS at least 30 days prior to the start of construction a detailed bill of materials required and material delivery schedule, to assure adequate time to procure all necessary materials.

Excess materials furnished by ECS and not used in the work shall be returned by the Contractor to the designated ECS storage yard for off-loading by ECS personnel.

**Construction Details:**

Installation of split PVC conduit shall be in accordance with Section 622-395-300 of the NYTSSP Handbook. Construction methods include the following:

**ITEM 11662.42 M - INSTALL CONCRETE ENCASED SPLIT PVC TELEPHONE CONDUIT (ECS)**

**A. Testing:**

1. Ducts designated for realignment are to be exposed and carefully broken out by the Contractor in one test area and scheduled for testing by ECS to determine whether cables are active.
2. Where individual conduits are determined to be abandoned, empty or contain inactive cable, the cable shall be cut and removed through the manholes. The ducts shall be cut and removed. They shall be replaced with solid PVC ducts. Ducts containing active cable shall be broken out, re-aligned and re-installed in split duct as described below, for which payment will be made under this item.

**B. Removal and Support:**

1. Using hand-held power tools, carefully break out, remove and dispose of all existing fibre, tile PVC, wooden or other ducts designated to be re-aligned which contain live cables. Steel or iron conduit shall be cut by the ring and rip method and removed using approved ripping tools.
2. Support and protect existing active cables as required.

**C. Adjust or Move Cables to New Alignment and Support:**

1. Cables shall be relocated horizontally and/or vertically as shown on the plans or required to suit field conditions, as directed by the Resident Engineer in consultation with ECS.
2. Support and protect existing active cables as required.

**D. Conduit Replacement, Protection and Support:**

1. The Contractor shall install the split duct around the supported active cables in the proposed duct alignment. Each split duct within the conduit bank shall be secured with bands or strap ties at .65 meter intervals. The PVC conduit shall be joined using an approved solvent. Conduit spacers shall be used where appropriate.
2. Joining new field split conduit to existing conduits of other diameters or materials shall be performed using single or multiple adapters supplied by ECS.
3. Support and protect conduit and cable as required.

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**ITEM 11662.42 M - INSTALL CONCRETE ENCASED SPLIT PVC TELEPHONE CONDUIT (ECS)**

4. Concrete shall have a maximum aggregate size of 7 mm and an average slump of 225 and shall be placed to the dimensions shown on the drawings.
5. If due to subsurface conditions, the cover is less than 500 mm from finished grade, the duct shall be protected with steel plates furnished by ECS for which payment will be made separately under the appropriate item.

**Method of Measurement:**

The quantity to be paid for under this section shall be the actual number of linear meters of PVC split-duct conduit installed, as measured along the longitudinal axis of each conduit in its final position. If solid PVC is placed (empty duct or inactive cable), the work shall be measured for payment under the appropriate item.

**Basis of Payment:**

The unit price bid per linear meter of concrete encased 89 or 102 mm Split PVC Conduit shall include all labor, equipment and specified materials necessary to complete the work including breaking out, removing and disposing of the plain or reinforced concrete encasement using hand-held power tools prior to breaking out the ducts shifting of telephone cables and placement of the concrete encasement.

**ITEM 11662.51 M - TELEPHONE MANHOLE (ECS)****Description:**

Under this item, the Contractor shall provide the necessary labor, specified materials and equipment, required to install Empire City Subway Company (ECS) manholes at the locations shown on the plans.

Since the telephone duct system is to be the property and responsibility of ECS, the specific requirements of ECS as stipulated in the plans, specifications and as ordered by the Engineer shall be met.

All work shall be in accordance with ECS requirements. ECS standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
Region 11 - Hunters Point Plaza  
47-40 21st Street  
Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions.

**Materials:**

ECS will furnish the cable racks, pulling-in irons, sump castings, hardware, manhole steps and cast iron frame and cover. ECS will deliver these materials to the Contractor at the construction site. The Contractor shall provide the structural concrete ( $f'c = 21$  MPa), reinforcing steel (ASTM A-615 - Grade 40), roof structural steel (ASTM A-36) and all materials necessary for cast-in-place construction of the manholes. The Contractor has the option of providing precast manholes in accordance with the material requirements of Subsection 704-03 of the NYSDOT Standard Specifications.

The Contractor shall notify ECS of the installation schedule at least thirty days before construction. Should ECS fail to deliver the necessary material according to the required schedule, the State will not be responsible for any delays attributable thereto, nor for the failure of delivery of such material.

It will be the Contractor's responsibility to inspect the materials immediately upon delivery and advise ECS of all damaged material. All material lost, or damaged after the Contractor's inspection has been completed, shall be replaced by the Contractor at his own cost and at no additional expense to the State.

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**ITEM 11662.51 M - TELEPHONE MANHOLE (ECS)**

**Construction Details:**

The installation of the manholes shall be in accordance with ECS standard specifications and drawings and as directed by the Engineer. The manhole shall be constructed in accordance with New York Telephone Subsurface Plant Handbook. (NYTSSP Handbook) Section 622-500-011, 622-505-210, 919-240-300 and all related sections referenced therein. Where replacement manholes are indicated on the plans, the work shall also include the demolition and removal of the existing manhole structure and the protection of existing cables and splices.

**Method of Measurement:**

The quantity to be measured under this item shall be the number of cubic meters of internal volume of ECS manholes actually installed in accordance with the plans, specifications and as ordered by the Engineer.

**Basis of Payment:**

The unit price bid shall include the cost of all labor, specified materials, and equipment necessary, including excavation and backfill, to complete the work.

**ITEM 11662.4002 M - INSTALL 2 NPS PLASTIC PIPE CONDUIT (ECS)**  
**ITEM 11662. 58 M - INSTALL BASE FOR PUBLIC TELEPHONE (ECS)**

Description:

Under this section, the Contractor shall provide all labor, equipment and all materials not supplied by Empire City Subway Company (ECS) necessary to install 2 NPS type 80 PVC pipe conduit, and public telephone foundation bases and appurtenances consisting of fish plates, spacers, and grounding coils, complete, as specified herein and as indicated on the contract drawings in accordance with the specifications and directions of the Engineer.

All work shall be in accordance with ECS requirements. ECS standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
Region 11 - Hunters Point Plaza  
47-40 21st Street  
Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions.

Materials:

Conduit and fittings will be furnished in commercial lengths by ECS. The Contractor shall furnish all materials for the coating, joining, spacing or temporary support of the respective conduit and fittings. Solvent cement for joining PVC conduits and fittings shall meet the requirements of ASTM D2564.

Public telephone foundation base materials and appurtenances consisting of fish plates, spacers and grounding coils will be furnished by ECS.

All materials provided by ECS will be delivered to the Contractor at the construction site and unloaded by the Contractor. The Contractor shall be responsible for the loss, theft of or damage to all materials and equipment furnished by ECS. The Contractor shall unload all materials in such a manner as to prevent damage and shall use appropriate devices to protect pipe coatings, etc. while handling. It shall be the responsibility of the Contractor to ensure that all materials are complete and free of defects or damage upon receipt. The Contractor shall provide suitable protection from theft or damage for all materials at the construction site. If the Contractor fails to inspect the material or accepts the material and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense.

**ITEM 11662.4002 M - INSTALL 2 NPS PLASTIC PIPE CONDUIT (ECS)**  
**ITEM 11662. 58 M - INSTALL BASE FOR PUBLIC TELEPHONE (ECS)**

The Contractor shall notify ECS at least 30 days prior to the start of construction to assure adequate time to procure all necessary materials.

**Construction Details:**

All work shall be as indicated on the Contract Plans and Specification and shall be in accordance with applicable ECS specifications and standard drawings, and the following guidelines:

- A. **Fish Plates:** The Contractor shall install fish plates, grounding coils and spacers according to diagrams I and II. (See attached Sketches CET-650A and B).
- B. **2 NPS PVC Conduit:** The Contractor shall install 2 NPS Type 80 PVC conduit (610 mm from proposed grade to top of conduit) from proposed Public Telephone station to ECS manhole. The Resident Engineer in consultation with ECS will choose the route from station to manhole. There shall not be more than 180 degrees in bends at each location. The Contractor shall cut and/or break into manhole, install and seal the conduit, and make repairs to the opening in the structure. See diagrams I, II, and III (Sketches 650A, B and C) for relative positioning of conduits.

Ducts entering the manholes shall be terminated at 25 mm from the inside of the manhole wall. All ducts shall be left with 10 mm polypropylene rope inside with sufficient length to attach a mandril.

A duct rodding device shall be passed through the completed ducts to check for continuity and cleanliness. Following the duct rodding, a mandril preceded by a wire brush shall be tied to the same rope of a size not less than 10 mm.

- C. **2 NPS Galvanized Steel Conduit:** The Contractor shall install 2 NPS steel conduit for electric service (610 mm from proposed grade to top of conduit) to the proposed Public Telephone station. The Resident Engineer in consultation with ECS and Con Edison will choose the route of the electric service conduit from the Public Telephone station. Payment for 2 NPS steel electric service conduit will be made separately under Item 11662.0502 M.

**Method of Measurement:**

The quantity to be measured for payment for the item entitled Install Base for Public Telephone shall be the number of locations where Public Telephones are designated to be installed. Multiple telephones placed adjacent to each other and fed through the same pair of conduits shall be considered one location.

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**ITEM 11662.4002 M - INSTALL 2 NPS PLASTIC PIPE CONDUIT (ECS)**  
**ITEM 11662.58 M - INSTALL BASE FOR PUBLIC TELEPHONE (ECS)**

The quantity to be measured for payment for the item entitled Install 2 NPS Plastic Pipe Conduit shall be the number of linear meters of 2 NPS conduit, PVC or galvanized steel, installed to feed Public Telephones.

**Basis of Payment:**

The unit price bid for each telephone base installation location shall include the cost of all labor, equipment, and incidentals required to install fish plates, spacers and grounding coils complete in place at each location. The price bid shall include, but not be limited to, the cost of excavation, installation, and backfilling required, and the support and protection of all underground facilities.

The unit price bid per linear meter of 2 NPS conduit installation shall include the cost of all labor, materials, equipment, and incidentals required to install 2 NPS PVC conduit, complete in place. Where conduits are to be connected to street light foundations and manholes, the cost of cutting and/or breaking into the manholes, installing and sealing the conduit, and making repairs to the openings in the structures shall be deemed included in the unit price bid for installation of conduit.

Other work such as pavement saw-cutting, trench excavation, temporary timber sheeting, backfilling with granular materials and pavement/curb restoration shall be paid for separately under the appropriate bid items.

INSTALLATION FOR SINGLE FISHPLATE

1. THE 51mm PVC AND 51mm GALVANIZED CONDUIT IS TO BE PLACED IN THE CENTER OF THE CUTOUT IN THE FISHPLATE. CONDUIT SHALL TERMINATE 876mm(±25mm) FROM FACE OF CURB, AT A HEIGHT OF 38mm TO 51mm ABOVE CURB. CONDUIT SHALL RUN BENEATH CURB AT A DEPTH OF 0.60m BELOW FINAL GRADE OF ROADWAY.
2. ALL BACK STUDS MUST BE LEVELED WITH HEIGHT OF CURB, THEN FISHPLATE SHALL BE LEVELED WITH BACK STUDS.

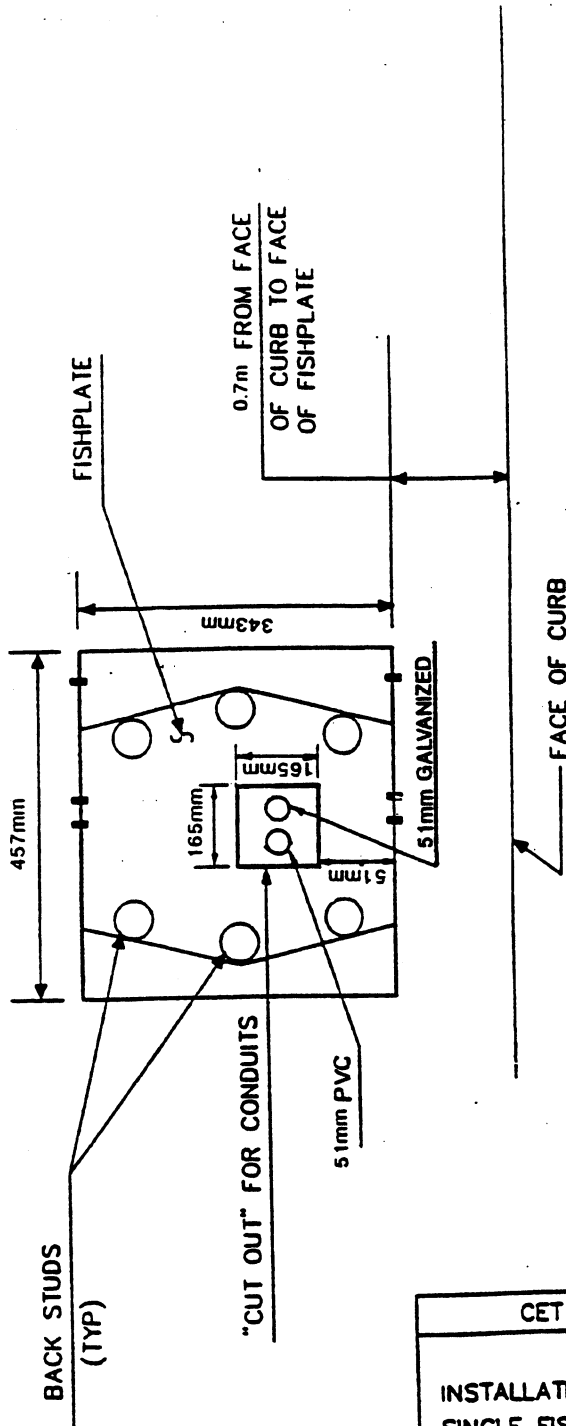


DIAGRAM I  
N.T.S.

REVISIONS	CET SKETCH	
	INSTALLATION FOR SINGLE FISHPLATE	
CONTRACT NO.	SKETCH NO.	
	CET 650 A	

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INSTALLATION FOR MULTIPLE FISHPLATES

1. THE 51mm PVC AND 51mm GALVANIZED CONDUIT IS TO BE PLACED IN THE CENTER OF THE CUTOUT IN THE FISHPLATE. CONDUIT SHALL TERMINATE 876mm(±25mm) FROM FACE OF CURB, AT A HEIGHT OF 38mm TO 51mm ABOVE CURB. CONDUIT SHALL RUN BENEATH CURB AT A DEPTH OF 0.6m BELOW FINAL GRADE OF ROADWAY.
2. ALL BACK STUDS MUST BE LEVELED WITH HEIGHT OF CURB THEN FISHPLATE SHALL BE LEVELED WITH BACK STUDS. SPACERS ARE TO BE BOLTED TO EACH FISHPLATE AS PER DIAGRAM. CONDUIT IS TO BE PLACED IN ONE FISHPLATE ONLY.

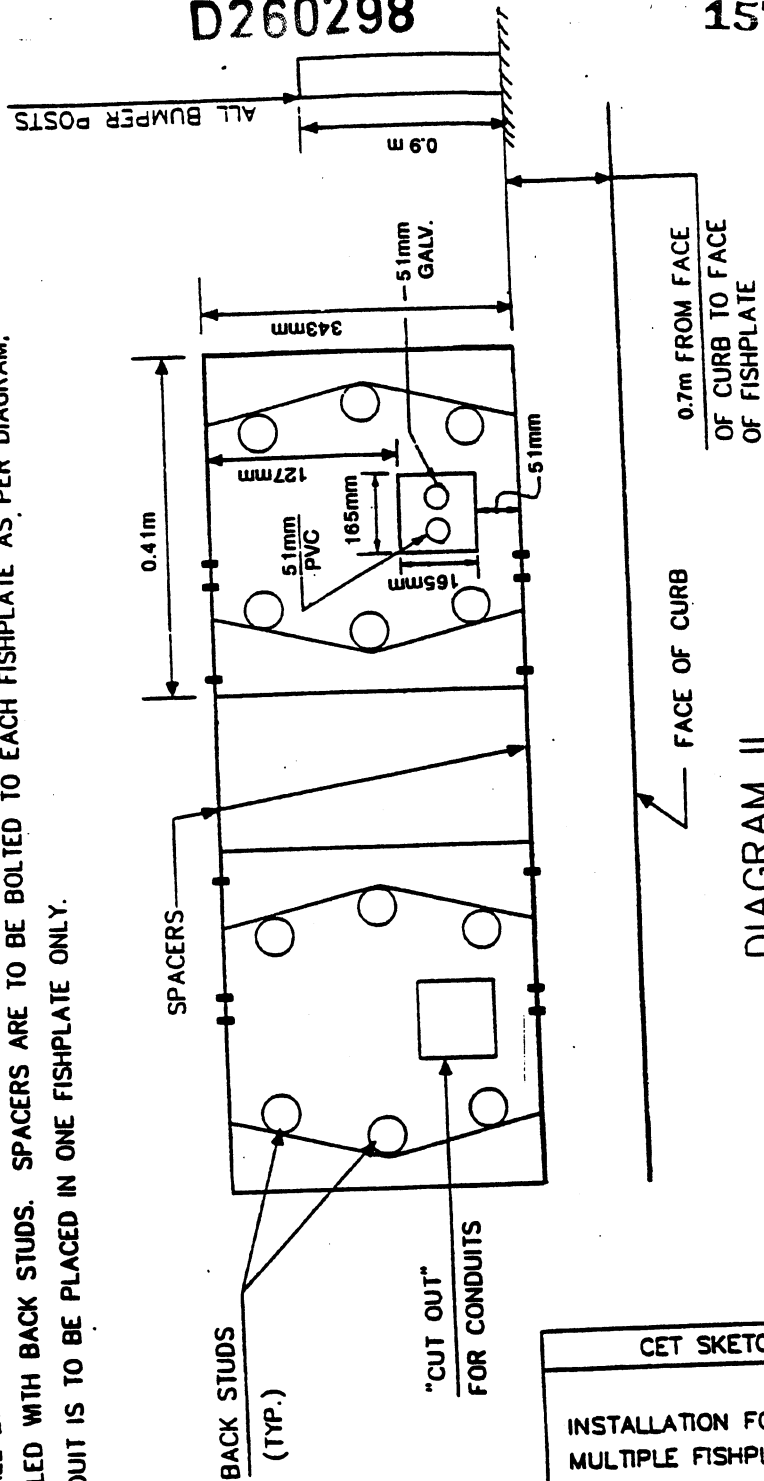


DIAGRAM II  
N.T.S.

REVISIONS		CET SKETCH	
INSTALLATION FOR MULTIPLE FISHPLATE		CONTRACT NO.	
CONTRACT NO.		SKETCH NO. CET 650 B	

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CONDUITS TO BE  
TERMINATED &  
CAPPED 38 mm TO  
51 mm ABOVE TOP  
OF SIDEWALK

51 mm PVC

51 mm GALV.

0.7 m

SIDEWALK

203 mm

FISHPLATE

GROUNDING COIL

BACK STUDS  
LEVEL WITH  
CURB (TYP.)

DEPTH OF CURB VARIES

CURB

ROADWAY

51 mm PVC CONDUIT (TO E.C.S. MANHOLE)

51 mm STEEL CONDUIT  
ITEM 11662.0502 M

152 mm  
MIN.

TERMINATE & CAP 51 mm  
STEEL CONDUIT  
305 mm FROM  
FACE OF CURB

**DIAGRAM III**

N.T.S.

CET SKETCH

PLACING OF  
CONDUITS

REVISIONS

CONTRACT NO.

SKETCH NO.  
CET-650C

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**ITEM 01662.65XXYY M - ALTERING UTILITY MANHOLES AND VAULTS**

**DESCRIPTION:**

The work shall consist of the alteration of existing utility manholes and vaults in accordance with the contract plans.

**MATERIALS:**

Materials used for the alteration of utility manholes and vaults shall meet the requirements of §604-2.01 and shall be as indicated on the contract plans. Structures originally constructed with concrete block, common brick, or concrete brick shall be altered with Precast Concrete Pavers, §704-13, unless indicated otherwise on the contract plans.

**CONSTRUCTION DETAILS:**

Excavation shall be in conformance with the construction details of Subsection 206-3, Trench Culvert and Structure Excavation.

Reconstruction and adjustment of existing utility manholes and vaults shall be as detailed and specified on the contract plans. Construction with cast-in-place concrete shall conform to the requirements of Section 555, Structural Concrete.

Frames and covers to be reused shall be removed, cleaned, and reset at the required elevations. New frames and manhole covers shall be installed when specified.

No structure shall be backfilled until all the mortar has completely set. The requirements of Subsection 203-3.15, Fill and Backfill at Structures, Culverts, Pipes Conduits, Direct Burial Cable, shall apply.

**METHOD OF MEASUREMENT:**

Altering utility manholes and vaults will be measured by the number of structures altered.

**BASIS OF PAYMENT:**

The unit price bid for each shall include the cost of all materials, labor, and equipment necessary to satisfactorily complete the work, including all necessary cleaning, excavation, backfill, and replacement of any pavement, shoulder, and sidewalk courses, subcourses, curbs, drives, lawns, and any other surface. Frames and covers to be reused that are broken by the Contractor's operations shall be replaced in-kind at the Contractor's expense. New frames and covers will be paid for under the appropriate payment items for Frames and Grates in Section 655.

Payment will be made under:

<u>ITEM NO.</u>	<u>ITEM DESCRIPTION</u>	<u>PAY UNIT</u>
01662.65XXYY M	Altering Utility Manholes and Vaults	Each

Where "XX" = Region (01 through 11)  
Where "YY" = Serialized 01 to 99 \*

\* Serialized number identifies structure detailed on the plans.

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**ITEM 11662.80 M - REMOVAL OF ABANDONED MASONRY (CON EDISON)**

**Description:**

Under this item the Contractor shall provide all labor, materials, equipment and incidentals required to remove all abandoned plain or reinforced concrete and/or masonry including but not limited to:

1. Abandoned Electrical Manholes and Service Boxes;
2. Concrete Encased Conduit Banks;

The work shall include the breaking, removal and disposal of plain or reinforced masonry at the locations indicated on the plans and as directed by the Engineer.

**Materials:**

All materials required shall be supplied by the Contractor and approved by the Resident Engineer in consultation with Con Edison.

**Construction Details:**

All equipment and demolition methods proposed for use under this item shall be subject to the approval of the Engineer in consultation with Con Edison.

Using hand-held power tools, the Contractor shall carefully break-out, remove and dispose of all existing concrete boxes and manholes designated to be abandoned, concrete encasements of live duct banks being re-aligned under a separate item with split duct, and other concrete or masonry removals as directed. All existing ducts and cables within the boxes/manholes or concrete encasements to be broken out, shall be supported and protected until such time as they are incorporated in the Work or abandoned and removed under other payment items.

Removal of the brick support for manhole/box frames and the return of castings to a designated Con Edison storage yard shall be performed by the Contractor at no additional cost.

**Method of Measurement:**

The quantity to be measured for payment shall be the actual volume of plain or reinforced concrete and/or masonry removed measured in cubic meters. No deduction will be made for conduit(s) within concrete encasements.

**Basis of Payment:**

The unit price bid per cubic meter shall include all labor, material, equipment, and incidentals necessary to remove the abandoned masonry and/or concrete in accordance with the plans, specifications and the directions of the Engineer. The price bid shall also include the cost of removal

**ITEM 11662.80 M - REMOVAL OF ABANDONED MASONRY (CON EDISON)**

and disposal of all materials, the sealing of existing abandoned conduit openings in manholes partially demolished, if required, and any other items necessary to perform all work incidental thereto.

Other work such as pavement saw-cutting, trench excavation (including test pits as directed), temporary sheeting, backfilling and pavement/curb restoration shall be paid for separately under the appropriate bid items.

**ITEM 11662.81 M - STEEL PLATE FOR SHALLOW INSTALLATION (CON ED AND ECS)****DESCRIPTION:**

This work shall consist of placing steel plates for protection of Con Edison and ECS conduit installation in shallow areas, as shown on the plans or as directed by the Engineer in consultation with Con Edison and ECS representatives.

**MATERIALS:**

The material will be specified by Con Edison or ECS

**CONSTRUCTION DETAILS:**

The steel plates shall be installed in accordance with pertinent Con Edison and ECS specification and drawings.

**METHOD OF MEASUREMENT:**

The quantity to be measured under this work will be the number of kilograms of steel plates placed in accordance with the plans and specifications; pay weights shall be calculated based on a theoretical unit weight of 7,800 kg/m<sup>3</sup>.

**BASIS OF PAYMENT:**

The unit price bid per kilogram shall include all labor, material and equipment necessary to complete the work.

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**ITEM 662.83 11 - INSTALL HEAT DEFLECTION SLAB (CON EDISON)**

**DESCRIPTION:**

Under this item, the Contractor shall provide all labor, equipment and all materials not supplied by Con Edison necessary to install heat deflection slabs between Con Edison steam mains and electric cables, as specified herein and as indicated on the contract drawings in accordance with the specifications and directions of the Engineer.

All work shall be in accordance with Con Edison requirements. Con Edison standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
Region 11 - Hunters Point Plaza  
47-40 21st Street  
Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions.

**MATERIALS:**

- A. Heat deflection slabs (EO-8935-D), including insulation material, will be furnished by Con Edison and shall have dimensions of either 600 mm by 1200 mm or 900 mm by 1500 mm.
- B. All materials provided by Con Edison will be delivered to the Contractor at the construction site and unloaded by the Contractor. The Contractor shall be responsible for the loss, theft of or damage to all materials and equipment furnished by Con Edison. The Contractor shall unload all materials in such a manner as to prevent damage and shall use appropriate devices to protect heat deflection slabs while handling. It shall be the responsibility of the Contractor to ensure that all materials are complete and free of defects or damage upon receipt. The Contractor shall provide suitable protection from theft or damage for all materials at the construction site. If the Contractor fails to inspect the material or accepts the material and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense.
- C. The Contractor shall submit to Con Edison at least 5 working days prior to the start of construction a detailed bill of materials required and material delivery schedule, to assure adequate time to procure all necessary materials.
- D. Excess materials furnished by Con Edison and not incorporated in the work shall be returned by the Contractor to the designated Con Edison storage yard for off-loading by Con Edison personnel.

**CONSTRUCTION DETAILS:**

- A. Installation of heat deflection slabs shall be in accordance with the plans and Con Edison reference specification EO-8935-D

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**ITEM 662.83      11 -      INSTALL HEAT DEFLECTION SLAB (CON EDISON)**

- B.      Slabs shall be installed against steam main housing. On installation of two or more slabs, they shall be butted together using 3 mm minimum thickness of the following insulating material to be provided by Con Edison:

Sure-Joint I-C 405 Compound, manufactured by Insul-Coustic Corp., or approved equal

**METHOD OF MEASUREMENT:**

The quantity to be paid for under this item shall be the actual number of square meters of heat deflection slabs installed.

**BASIS OF PAYMENT:**

The unit price bid per square meter shall include the cost of all labor and equipment and materials not provided by Con Edison as necessary to complete the work

**ITEM 662.8312 11 - INSTALL 12 NPS STEEL GAS MAIN (CON EDISON)**  
**ITEM 662.8316 11 - INSTALL 16 NPS STEEL GAS MAIN (CON EDISON)**

**DESCRIPTION**

Under this section, the Contractor shall provide all labor, equipment and all materials not supplied by Con Edison necessary to install, clean, test and place into satisfactory service new steel gas mains, tracer wire, tracer wire termination boxes and appurtenances, complete, as specified herein and as indicated on the contract drawings in accordance with the specifications and directions of the Engineer, in consultation with the Con Edison field representative.

All work shall be in accordance with Con Edison Requirements. Con Edison standard drawings and specifications referenced herein shall be obtained by the Contractor directly from:

New York State Department of Transportation  
 Region 11- Hunters Point Plaza  
 47-20 21st Street  
 Long Island City, NY 11101

It shall be the responsibility of the Contractor to ensure that all reference specifications and drawings include the latest revisions in effect at the time of bidding.

**MATERIALS**

A. All materials will be provided by Con Edison unless specifically noted otherwise. All materials provided by Con Edison will be delivered to the Contractor at the construction site and unloaded by the Contractor. The Contractor shall provide suitable protection and be responsible for the loss, theft of or damage to all materials and equipment furnished by Con Edison. The Contractor shall unload all materials in such a manner as to prevent damage of any kind and shall use appropriate devices to protect pipe, valves etc. while handling. It shall be the responsibility of the Contractor to ensure that all materials are complete and free of defects or damage upon receipt. If the Contractor fails to inspect the material or accepts the material as is, and the material is damaged, lost or deemed inappropriate, such material shall be replaced at the Contractor's expense.

The Contractor shall submit to the Engineer and Con Edison at least 30 days prior to the start of gas main construction a detailed bill of materials and a material delivery schedule to assure adequate time to procure all necessary materials.

B. The following Con Edison Standards apply to all materials:

1. Specifications:
 

G-100,285	:	Compression End Couplings, Tees, Elbows, Line Caps and Riser Tees for Gas Pipe and Tubing.
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2. Drawings:
 

EO-4067-G	:	Precast Concrete Cover for Curb Valve Box in Sidewalk.
EO-4070-C	:	Cover for Curb Valve Box Located in the Street.

**ITEM 662.8312 11 - INSTALL 12 NPS STEEL GAS MAIN (CON EDISON)**  
**ITEM 662.8316 11 - INSTALL 16 NPS STEEL GAS MAIN (CON EDISON)**

EO-13987-B : Temporary Locking Device for Cast Iron Curb Gas Valve Box.  
 EO-19241-D : Base for .75 NPS thru 2 NPS Plastic Valves and 1.5 NPS and 2 NPS Steel Valves Used on Gas Mains and Services.  
 EO-3942-C3 : Wood Plugs for Use with Cast Iron and Steel Pipes  
 EO-4019-C : Street Valve Box  
 EO-4044-C : Cast Iron Curb Valve Box 610 mm Extension- Type CV24.  
 EO-4045-C : Cast Iron Curb Valve Box 800 mm Extension- Type CV32.  
 EO-5102-D : Precast Concrete Base for Street Valve Box  
 EO-5315-D : Bed Blocks and Wedges for Laying Gas Pipe  
 EO-6799-C : Protective Covers for Gas Main Installations.

C. The Contractor shall provide necessary fittings and gauges for pressure testing and shall provide all pressurizing equipment (air compressors, hoses, tools, test medium and similar items) for testing the new main assemblies.

D. Protection Plate: 10 mm type A36 steel.

**CONSTRUCTION DETAILS:**

A. Installation of pipe, fittings, valves, etc. shall be at the locations and depths shown on the Drawings, or as directed by the Engineer, in accordance with the following Con Edison Standards:

1. Specifications:

SPEC. 900 : Installing Gas Mains, Regulator Stations and Services-New York City and Westchester county  
 G-1064 : Shielded Metal Arc Welding Procedure for Welding Steel Pipe and Fittings  
 G-1065 : Qualification of Welders and Welding Procedures  
 G-1066 : Qualification of Radiographers and Radiographic Procedures  
 G-1070 : Radiographic Inspection of Pipeline Welds  
 G-8003 : Transportation, Handling and Storage of Steel Pipe for Gas Mains and Services  
 G-8005 : General Specification for the Installation of Gas Distribution Mains.  
 G-8100 : General Specification for the Installation of Gas Services.  
 G-8129 : Purging Gas Mains, Services and Regulator Stations.  
 G-8194 : Street Opening Color Coding, Permit Signs at Worksite and Pavement Restoration Markers  
 G-8201 : Electric Spark Inspection of Coating on Steel Pipe

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**ITEM 662.8312 11 - INSTALL 12 NPS STEEL GAS MAIN (CON EDISON)**  
**ITEM 662.8316 11 - INSTALL 16 NPS STEEL GAS MAIN (CON EDISON)**

- G-8205 : Corrosion Control of Steel Gas Distribution Mains and Services
- G-8209 : Field Coating of Steel Pipe and Fittings Installed Underground and in Subsurface Structures
2. Drawings:
- EO-5261-C : High Hats for Plugs and Nipples on 6 NPS-30 NPS Steel Gas Mains 13.8 – 2413.2 kPag
- EO-14134-C : Thermit Weld Process for Attaching Wire to Pipe or Fittings
- EO-14620-C : Segmenting Long Radius Forged Elbows
- EO-13911-B : Installation of 6 NPS – 30 NPS Weld End ball Valve and Valve Box for HP Gas Mains
- EO-16954-B : Sheeting for Trenches and Excavations.
- EO-15636-C : Field Fabricated Extension for Gas Valve Installations over 1.2 meters of cover.

Trenching and excavation shall be done at the required locations and to the required depths shown on the Drawings or as directed by the Engineer, in accordance with Con Edison Standards for sheeting and excavation. No change in location or grade of the new gas main shall be made without written approval of the Engineer.

The trench shall be cleaned before installation of pipe and maintained until backfill is completed. All debris, rubble and stones are to be removed on a daily basis.

The Contractor shall thoroughly clean each pipe length and fitting to remove all internal dirt and foreign matter before the pipe is lowered into the trench. This cleaning operation shall not be conducted on more than four pipe lengths or fittings ahead of the laying of the pipe. The Contractor shall also inspect and clean out, if necessary, each pipe length and elbow in the trench immediately before joining up to the installed pipe.

At the close of each day's work, or whenever work is to be suspended for any length of time, the Contractor shall securely close all open pipe ends with end caps to be furnished by Con Edison. End caps shall not be removed until the work is resumed. All end caps shall be installed in such a manner that they cannot become accidentally loosened or removed, and any obstructions entering into or remaining in the line shall be removed at the expense of the Contractor.

The minimum clearance between the new mains and other subsurface structures shall be 150 mm for less than 862 kPag mains. Clearance of less than 150 mm is unacceptable

**ITEM 662.8312 11 - INSTALL 12 NPS STEEL GAS MAIN (CON EDISON)**  
**ITEM 662.8316 11 - INSTALL 16 NPS STEEL GAS MAIN (CON EDISON)**

without written approval of the Engineer. Should the Engineer give such approval, in no case shall the clearance be less than 50 mm and the main must be padded with plastic mesh type rockshield.

All non-plastic bends shall conform to Specification G-8005. Miter bends are allowed up to 45 deg. on low pressure pipe. Miter bends greater than 3 deg. must be radiographically inspected.

All joints on steel pipe shall be welded. Only personnel qualified in accordance with G-1065, "Qualification of Welders and Welding Procedures" and G-1066, "Qualification of Radiographers and Radiographic Procedures", shall be allowed to join steel pipes.

**B. Installation of Fittings**

Fittings shall be defined as couplings, forged fittings, valves, insulating joints, weld end caps and weldolets.

Forged fittings where applicable shall be used for all high pressure pipe bends greater than 12.5 degrees.

All forged bends shall conform to Con Edison Specification G-100, 281, "Welded Forged Fittings for Gas Piping".

Bends other than standard (90 deg., 45 deg. and 22-½ deg.) shall be cut from forged fittings in accordance with Con Edison Specification EO-14620-C.

Weld end insulating joints shall be welded into the line by the Contractor where specified on the drawings.

Prior to installation, each insulating joint shall be checked with a continuity tester by Con Edison. The insulating joint shall not be installed until the Contractor has verified with the Con Edison Field Representative that the continuity test is acceptable.

The cost for testing the insulation joint shall be included in the unit price for the appropriate size of gas main.

**C. Pressure Testing Inerting:**

The newly completed gas main shall be subjected to a combination strength-proof and leakage test by the Contractor in accordance with G-8204. The test shall be a pressure drop shut-in test with no drop in pressure permitted.

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**ITEM 662.8312 11 - INSTALL 12 NPS STEEL GAS MAIN (CON EDISON)**  
**ITEM 662.8316 11 - INSTALL 16 NPS STEEL GAS MAIN (CON EDISON)**

The Contractor shall give the Con Edison Field Representative three (3) weekdays notice of intent to pressure test the pipeline.

The Contractor shall furnish all material, transportation and equipment, including gas and air necessary to perform the complete pressure testing and inerting operations, including the equipment used to record the test. Inerting shall be defined as the process of displacing air or natural gas in a facility with an inert gas.

The Contractor shall provide personnel for the duration of the tests including stabilization periods, to continuously observe the recordings and protect the equipment and valve arrangements.

Dished-head weld end caps shall be welded at each end of the piping. Compression type end caps or flat plates welded over the pipe ends shall not be used.

All personnel are to remain out of the trench during pressure testing operations.

The Contractor shall be responsible for locating and repairing any leaks indicated by the pressure tests. If a repair is required, the complete cycle of pressure testing shall be repeated at the Contractor's expense.

The Contractor shall install test connections as indicated on the drawings and EO-5261-C, "High Hats for Plugs and Nipples on 6 NPS – 30 NPS Steel Gas Mains 13.8 – 2413.2 kPa".

The pressure test shall be measured using two pressure gauges, deadweight gauges furnished by the Contractor and approved by Con Edison's field representative. Continuous readings will be recorded on a visible chart.

The Contractor shall install a weatherproof shelter around the gauges and recording charts when directed by the Con Edison Field Representative.

- D. All exposed coated steel gas mains where the coating is found damaged shall be cleaned and the coating shall be replaced in kind in accordance with Specification G-8062.
- E. Magnesium anodes and test stations shall be installed at the locations shown on the plans or directed by the Engineer. Con Edison will supply thermit weld equipment. All test lead wires shall be tested by Con Edison's Corrosion Survey Section before backfilling.

**METHOD OF MEASUREMENT:**

The quantity to be paid for under these items will be the actual number of meters installed for each pipe size, as measured along the center line of the pipe in its final position.

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ITEM 662.8312 11 - INSTALL 12 NPS STEEL GAS MAIN (CON EDISON)  
ITEM 662.8316 11 - INSTALL 16 NPS STEEL GAS MAIN (CON EDISON)

**BASIS OF PAYMENT:**

The unit price bid per meter shall include the cost of all labor and equipment and materials not provided by Con Edison as necessary to complete the work. The price per meter of steel gas main shall include pipe installation, cutting of pipe, joining by welding, installation of fittings, adapters and castings, installation of magnesium anodes, repair of damaged pipe

coatings and testing and inerting. Other work such as pavement saw-cutting, trench excavation, temporary timber sheeting, backfilling with granular materials, compacting, valve installation, protection plates and pavement/curb restoration shall be paid for separately under the appropriate bid item.

**ITEM 11662.99 M - IDENTIFICATION OF UNKNOWN UTILITIES****DESCRIPTION:**

Under this item, the Contractor shall, when directed in writing by the Engineer-in-Charge, provide support for identification of unknown utilities. The item of work contained herein shall be coordinated to the extent possible with the public and private utilities to assure economical and timely identification of unknown underground pipes, conduits or duct banks.

**MATERIALS:**

The materials and equipment employed in the performance of this work shall be approved by the individual public and private utilities and the Engineer.

**CONSTRUCTION DETAILS:**

The Engineer shall have the authority to order certain work in connection with the identification of unknown utilities encountered in the excavation where in interference with the planned work.

All work is to be performed with extreme care and any active utilities damaged due to the Contractor's negligence, carelessness or failure to properly install sheeting, bracing, or temporary supports shall be immediately restored by the Contractor at no cost to the State or the Utility.

**METHOD OF MEASUREMENT:**

Where the work to be performed falls within the specifications for a work item that has a contract price, the units of work shall be computed at the proper contract price for lump sum payment as hereinafter stated. Should the work not be comparable to the project work under the applicable contract items, the Contractor shall be ordered to perform the work on a force account basis, or by agreed unit prices as approved by the Regional Construction Supervisor with Main Office assistance if necessary. Any active utilities damaged due to the Contractor's negligence, carelessness or failure to properly install sheeting, bracing, or temporary supports shall be immediately restored by the Contractor at no cost to the State or the Utility.

The lump sum of money shown in the itemized proposal for this work will be considered the price bid even though payment will be made only for actual work performed. This lump sum figure is not to be altered in any manner by the bidder. Should the bidder alter the amount shown, the altered figure will be disregarded, and the original price will be used to determine the total amount bid for the contract.

The quantity to be paid for will be computed by one or any combination of the following

**ITEM 11662.99 M - IDENTIFICATION OF UNKNOWN UTILITIES**

methods:

1. **Contract Work.** Where contract bid items cover the work ordered, the amount obtained by the product of the quantity and the unit bid price of the items.
2. **Agreed Unit Prices.** Where no contract bid items are available, the amount obtained by the product of the item quantities and agreed unit prices.
3. **Force Account.** By force account records where bid prices do not exist and agreed prices are not available for temporary work items.

**BASIS OF PAYMENT.**

The lump sum for this work includes the cost of furnishing all materials, labor and equipment to satisfactorily complete the work for testing of unknown utilities ordered to be performed within the work limits by the Engineer. Monthly payments will be made for this work for the amount of work completed during the estimate period.

Measures that are made necessary by the Contractor's negligence, carelessness or failure to install sheeting, bracing or temporary supports as part of the work shall be ordered by the Engineer to be accomplished and performed by the Contractor at the Contractor's own expense.

In case of failures on the part of the Contractor to immediately restore active utilities damaged by the Contractor's negligence, carelessness or failure to install sheeting, bracing or temporary utility supports, the Engineer reserves the right to employ outside assistance or to use public or private utility forces to provide the necessary corrective measures. Such incurred direct costs plus project engineering costs will be charged to the Contractor and appropriate deductions made from the Contractor's monthly progress estimate.

**ITEM 11665.10 M - FURNISH AND INSTALL BOLLARDS****DESCRIPTION:**

Under this item, the Contractor shall furnish and install the new cast iron bollards and pipe supports in locations shown on the plans, in accordance with the Contract Drawings, these specifications and as directed by the Engineer.

**MATERIALS:**

Materials shall meet the following requirements:

Cast Iron Bollards	ASTM A48 Grade 30-B Gray Cast Iron in color selected for this project. Bollard shall have a minimum wall thickness of 9.50 mm and weight 100 kilograms.
Pipe, Carbon Steel, Seamless	ASTM A106, Schedule 80, galvanized, 152 mm diameter concrete filled.
Steel Plate	Subsection 715-01
Concrete	Subsection 501, Class A
Portland Cement	Subsection 701-01
Paint	Subsections 708-03 and 708-08

**CONSTRUCTION DETAILS:**

Bollards shall be furnished and installed according to the details and at locations shown on the plans, complete with pipe supports, base plates and anchor bolts.

Pipe supports and base plates shall be coated with dull orange primer and asphalt-base emulsion prior to setting.

Install pipe supports, anchor bolts, base plates and bollards as detailed on the drawings and as directed by the Engineer.

**METHOD OF MEASUREMENT:**

The quantity to be paid for under this item will be the number of bollards installed in accordance with the plans, these specifications and the directions of the Engineer.

**BASIS OF PAYMENT:**

The unit price bid for bollards shall cover the cost for furnishing, delivering and installing the bollards, complete with pipe supports, anchor bolts, base plates and concrete bases, and all other labor, materials, equipment and incidentals necessary to complete the work.

**ITEM 665.14      11 - TYPE 2 BOLLARD - STATIC****DESCRIPTION**

Under this item, the Contractor shall provide the necessary labor, specified materials and equipment, required to install Type 2 – Static Bollards at the locations shown on the plans.

All work and materials shall be in accordance with the contract documents, specifications and requirements, manufacture's recommendations, and as ordered by the Engineer.

**MATERIALS**

Materials shall meet the requirements of the following subsections:

Concrete Fill	501, Class A
Footing Concrete	501, Class A
Structural Steel Pipe	715-01
Epoxy-Coated Bar Reinforcement, Grade 420	709-04
Temporary Sheeting	552-2.02

Type 2 – Static Bollards consist of concrete and steel reinforcing as detailed on the plans. The bollard cover shall be as detailed on the plans.

**CONSTRUCTION DETAILS**

Excavation and backfill for bollard foundations shall be in accordance with Subsection 203-3

Sheeting installation shall be in accordance with Subsection 552-3.02

The installation of the Type 2 – Static Bollards shall be as detailed on the plans and in accordance with the standard specifications and drawings and as directed by the Engineer.

Shop drawings shall be submitted to the Engineer for review and approval..

**METHOD OF MEASUREMENT**

The quantity to be measured under this item will be the number of static bollards actually installed in accordance with the plans, specifications and as ordered by the Engineer.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of all labor, specified materials, and equipment necessary, to complete the work. Payment for excavation, backfill and sheeting, in connection with bollard construction, will be included in the cost of this item.

**ITEM 665.15 11 - TYPE 2 BOLLARD - RETRACTABLE****DESCRIPTION**

Under this item, the Contractor shall provide the necessary labor, specified materials and equipment, required to install Type 2 – Retractable Bollards at the locations shown on the plans.

All work and materials shall be in accordance with the contract documents, specifications and requirements, manufacture's recommendations, and as ordered by the Engineer.

**MATERIALS**

Materials shall meet the requirements of the following subsections:

Footing Concrete	501, Class A
Structural Steel Pipe	715-01
Epoxy-Coated Bar Reinforcement, Grade 420	709-04
Temporary Sheeting	552-2.02

Type 2 – Retractable Bollards consist of concrete and steel reinforcing as detailed on the plans, together with a hydraulic power unit, operating controls, power circuits and operating logic necessary to operate the bollards as specified here within.

The bollard cover shall be as detailed on the plans.

**Speed of Operation:**

- Normal Mode – Each bollard (or bollard set) shall be capable of being raised or lowered in normal operation mode within 30 seconds when operated at a rate of not more than 60 cycle per hour. Bollard direction shall be instantly reversible at any point in its cycle from the control stations.
- Emergency Mode – Each bollard (or bollard set) shall rise to the full height position from the fully down position within 3 seconds maximum when the Emergency Fast Operate (EFO) button is pushed, provided that the system has not been exhausted by power off, manual operation, or a previous Emergency Mode operation within the previous 5 minutes. The bollards shall remain in the up and locked position (normal mode – up/down buttons inoperable) until the Emergency Mode condition is reset.

Operations Controls - Type 2 – Retractable Bollards shall be controlled from two control stations; a remote security station / guard booth and the security command center. The remote security station / guard booth shall be located within 200 feet of the Type 2 – Retractable Bollards and the security command center shall be located within 1000 feet of the Type 2 – Retractable Bollards. During normal operations, both control stations shall be able operate the bollards (or bollard sets). Both control stations shall be able to activate the Emergency Mode, but only the security command center can reset the Emergency Mode condition.

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**ITEM 665.15 11 - TYPE 2 BOLLARD - RETRACTABLE**

**CONSTRUCTION DETAILS**

Excavation and backfill for bollard foundations shall be in accordance with Subsection 203-3

Sheeting installation shall be in accordance with Subsection 552-3.02

The installation of the Type 2 – Retractable Bollards shall be as detailed on the plans and in accordance with the standard specifications and drawings and as directed by the Engineer.

Shop drawings shall be submitted to the Engineer for review and approval. The shop drawings shall contain details of the operations and controls.

Single Type 2 – Retractable Bollards. Each individual bollard shall be operated independently from any other bollard within the system. Each bollard shall have its own controls.

Multiple Type 2 – Retractable Bollards operating in sets. Each set of bollards shall consist of 4 bollards. Each set of bollards shall have its own controls and operate independently from each other set of multiple bollards with the system.

The contractor shall provide all conduits, wiring and controls necessary to operate the Type 2 – Retractable Bollards from the remote security station / guard booth (located within 200 feet of the bollards). The remote security station / guard booth will be provided by others. Connection from the remote security station / guard booth to the security command center will be provided by others.

**METHOD OF MEASUREMENT**

The quantity to be measured under this item will be the number of Type 2 - Removable Bollards actually installed in accordance with the plans, specifications and as ordered by the Engineer.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of all labor, specified materials, and equipment necessary, to complete the work. Payment for excavation, backfill and sheeting, in connection with bollard construction, will be included in the cost of this item.

**ITEM 11665.20M - FURNISH AND INSTALL YELLOW PLASTIC BOLLARDS****DESCRIPTION:**

This work shall consist of furnishing and installing yellow plastic bollards at locations specified in the contract documents or as directed by the Engineer.

**MATERIALS:**

The material should consist of yellow reboundable bollards and pavement anchor assemblies as supplied by:

Qwick Kurb INC.  
1919 US 41 South  
Ruskin, FL 33570  
E-mail: qwickkurb@ithink.net  
Phone: 800 324-8734  
Fax: 813 645-4856

or equal as approved by the Engineer.

**CONSTRUCTION DETAILS:**

The Contractor shall properly align and install yellow plastic bollards as per the manufacturer's instructions.

**METHOD OF MEASUREMENT:**

This work will be measured as the number of yellow plastic bollards installed.

**BASIS OF PAYMENT:**

The unit price shall include the cost of all labor, materials, and equipment necessary to complete the work.

**ITEM 665.2001 11 M - ACCESS DOOR WITH INTEGRAL GRANITE PAVERS,  
25 MM THICK**

**DESCRIPTION**

The work shall consist of furnishing and installing new aluminum access sidewalk doors with integral granite pavers.

**MATERIALS**

Cover shall be reinforced to support a minimum live load of 1,465 kg/m<sup>2</sup> (300psf) with a maximum deflection of 1/150<sup>th</sup> of the span. Operation of cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing. Operation of cover shall not be affected by temperature.

Cover shall include a 25mm fillable pan to receive Granite Pavers, 25mm thick, which shall adhere to the pan. Dimensions of the cover opening shall be as shown on the plans. Frame shall consist of extruded aluminum with full anchor flange around the perimeter. Aluminum frame thickness shall be as per the manufacturer. Hinges shall be continuous heavy duty Type 316 stainless steel hinge that is accessible only when the cover is in the open position. Support details as shown on the plans. Doors shall be equipped with heavy forged brass hinges, ASTM A-316 stainless steel pins, compression spring operators, automatic hold open arm with release handle, and snap lock with removable handle. Pedestrian safety chains shall be provided. A removable key wrench and removable plug shall be provided and delivered to the building owner at the completion of work.

The door leaves and frame shall be Hot Dip Aluminum coatings in accordance with Section 719-03 of the NYSDOT Standard Specifications.

Acceptable door manufacturers are the following or an approved equal:

Bilco Company (Type "TER" & "TRD") New Haven, CT or equal by  
Dur-Red Products, Cudahy, CA, or  
Babcock-Davis Hatchways Inc., Arlington, MA

Epoxy adhesive for bonding of granite to door shall be of the highest grade commercially available for this application. Mortar shall conform to the requirements of Section 705-21 of the Standard Specifications (Metric Edition). Concrete base shall conform to the requirements of Section 501 Portland Cement – General, Class C. Stone shall be engineering grade structural granite, hard and durable, seamless and of smooth splitting character. Natural variations characteristic of the deposits will be permitted. Granite shall be of a fine to medium grained, sound and durable granite. The granite shall be reasonably uniform in quality and texture throughout and shall be free of any excess of mica and feldspar and from seams, scales and evidence of deterioration. Granite pavers shall be of the sizes, type, color and finishes as called for in the contract documents. Prior to the fabrication of the pavers to be installed, a full size sample paver of each type shall be submitted to the Engineer for approval. Samples shall be clearly labeled with the Contract Number, item number, manufacturer/source, color(s), size and finish(es). All granite pavers used in the work shall conform to the approved samples. The sample paver, if approved, shall be used on the project. The Contractor shall be responsible for any and all other samples submitted for approval.

**ITEM 665.2001 11 M - ACCESS DOOR WITH INTEGRAL GRANITE PAVERS,  
25 MM THICK****CONSTRUCTION DETAILS**

Granite pavers shall be free of any dust or debris caused by the method of etching before delivered to the site. Mortar for setting bed shall be mixed in such quantities as needed for immediate use. For small quantities, mortar bed shall be mixed in a batch-type machine mixer. Materials that have been mixed for a period of more than 30 minutes shall not be used. Retempering of mortar bed will not be permitted. The location and layout of granite pavers shall be as indicated in the contract documents and is subject to approval by the Engineer in coordination with the Regional Landscape Architect. All edges, borders and corners of the paver shall be finished to true and neat lines. Special cutting, various shapes, and variations in size and finish are all to be included in the unit price bid. Each paver shall be cleaned by brushing or other non-abrasive means immediately prior to installation. Prior to setting on the mortar bed, each paver shall be coated on the underside by troweling with a mixture of Portland cement and water. The mixture shall be of stiff creamy consistency. Mortar droppings or smears on the exposed faces of pavers shall be brushed off immediately after the paver is set. Any paver that becomes loose after the mortar bed has set shall be removed, cleaned, and relaid with fresh mortar. After the granite pavers have been set, mortar shall be placed into the joints and struck smooth. The Contractor shall protect the granite pavers with integral street names or bicycle symbols for the duration of the contract. The Contractor, at no expense to the State, shall repair any damage done to the adjacent areas. Where defects in material or installation appear in the completed work, such areas shall be removed to the full depth of the course and the defective material replaced with new for the required thickness of pavement at no expense to the State.

The aluminum door and frame shall be located as shown on the plans. The doors shall be held firmly in place while the concrete placement is performed.

Shop drawings and/or catalog cuts shall be submitted to the Engineer for review.

**METHOD OF MEASUREMENT**

This work will be measured as the number of access doors with integral granite pavers, 25 mm thick, satisfactorily furnished and installed, regardless of the number of leaves per door.

**BASIS OF PAYMENT**

The unit price bid for this item shall include the cost of all labor, equipment, and materials required to complete the work. The cost for concrete placement surrounding the access door frame will be paid for under its appropriate item.

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**ITEM 11670.0310 M - REMOVE AND STORE LAMPOST ASSEMBLY**  
**(BUREAU OF GAS AND ELECTRICITY)**

**DESCRIPTION**

Under this item the contractor shall remove and store existing lampposts assemblies, including arms and luminaires, where shown on the plans or where directed by the Engineer.

**MATERIALS**

Not specified

**CONSTRUCTION DETAILS**

All lamppost assemblies shall be removed and stored in a neat and workmanlike manner in accordance with the "General Specifications for street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS - Compiled 1970 for use with State of New York Department of Transportation Construction contracts".

All lamppost, luminaries and brackets removed shall remain the property of the Bureau of Gas and Electricity and shall be stored by the Contractor for pick-up by the City of New York.

**METHOD OF MEASUREMENT**

The quantity to be measured under this item will be the number of lamppost assemblies removed and stored as prescribed.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of all labor, materials and equipment necessary to complete the work.

**ITEM 11670.1080 M - TYPE M LAMPOST, 7.75 METER MOUNTING HEIGHT - 3.05  
METER ARM**

**DESCRIPTION**

The work under this section includes furnishing all labor, materials, equipment and components to install Type M Lampposts with Type M Mast Arms for supporting Teardrop type luminaires.

**MATERIALS**

A. Lamppost.

1. **General.** The lamppost shall be as shown on drawings, consisting of a one-piece base and shaft section, intermediate shaft section and a mast arm. Lamppost style shall be Type M as manufactured by Spring City Electrical Manufacturing Company, Spring City, Pennsylvania, Emery Fixtures Inc., Emporia, Kansas or Visco, Eugene, Oregon or approved equal. The overall height from bottom of base to the center line of the mast arm shall be 8.41 m. The height from bottom of base to luminaire center shall be 7.75 m.
2. **Base and Shaft Section.** The base and shaft section shall be one-piece, heavy wall cast iron per ASTM A48, Class 30. Minimum acceptable wall thickness shall be 13 mm with a minimum base plate thickness of 32 mm. Minimum acceptable weight shall be 295 kg. Height of section from bottom of base to top of section shall be approximately 4.25 m. The base shall be 533 mm diameter round and shall have four slotted holes, 76 mm long by 32 mm wide, to accept anchor bolts set for a 366 mm bolt circle pattern. A cast iron access door shall be provided in the base as well as a "New York City" identification label to be located 135 degrees from the center line of the access door as shown on plans.
3. Intermediate shaft section shall be one-piece, approximately 2.67 m long, 114 mm diameter heavy aluminum tubing per ASTM B26-88 using 6061-T6 alloy. Minimum acceptable wall thickness shall be 13 mm.
4. **Mast Arm.** The mast arm shall consist of the upper shaft lamppost section, flat stock scroll and luminaire mounting arm. The upper shaft section and luminaire mounting arm shall be standard Schedule 40 aluminum piping per ASTM B26-88 using 6061-T6 alloy. The upper shaft section shall be one piece approximately 2.51 m long, 76 mm diameter. The mounting arm shall consist of 1.80 m, 63.5 mm diameter and 1.30 m, 51 mm diameter pipes. The flat stock scroll shall be aluminum per ASTM B26-88 using 6061-T6 alloy.
5. **Casting.** Casting shall be constructed of aluminum per ASTM B26-88 using 356-T6 alloy. All castings shall be done in a workmanlike manner, which shall result in uniform castings free from abnormal physical qualities, pouring faults, porosity, cracks, blow holes, warping,

**ITEM 11670.1080 M - TYPE M LAMPOST, 7.75 METER MOUNTING HEIGHT - 3.05**  
**METER ARM**

shrinkage defects, or flaws which affect the strength, value, or suitability of the castings for their intended use.

- B. Mounting Hardware. With the exception of the anchor bolts, all mounting hardware (bolts, nuts, washers, screws) shall be stainless steel. The sizes of hardware shall be as indicated on the drawings.
- C. Anchor Bolts. All anchor bolts utilized for lamppost mounting shall conform to the applicable requirements of the NYSDOT Standard Specifications, Section 723-60.

**CONSTRUCTION DETAILS**

- A. Type M lampposts shall be constructed as described herein and as shown on the plans.
- B. Type M lampposts shall be installed at locations as shown on the plans. Attach lampposts on top of the concrete and steel barriers as shown on the plans.
- C. The access door in the base shall be secured by stainless steel tamper resistant round head bolts.
- D. A finial shall be provided and installed to the top of the lamppost and shall be secured with (3) 6.35 x 1.25 stainless steel set screws located 120 degrees apart.
- E. A 120 volt twist lock photoelectric control unit and receptacle shall be provided and installed to the top of the finial for lampposts as indicated on drawings. Twist lock type receptacle and supports for plug-in type control unit shall conform to the requirements of NYCDOT, Street Lighting Division Standard Drawing No. H-3731. The photo-electric control unit shall conform to the requirements of the New York State Department of Transportation (NYSDOT) Standard Specifications, Section 723-50.
- F. The New York City identification label on the base of each lamppost shall be stamped in accordance with the requirements of the City of New York, Division of Street Lighting, Specification No. 102, Section VII.
- G. Lamppost shall be prime painted using a hi-solid, low VOC two part recoatable epoxy primer. Finish coat shall consist of two coats of a hi-solid polyurethane low VOC two part top coat.
- H. One 8 x 1.5 tapped hole shall be provided, opposite to the access door in base for installation of a ground lug.
- I. All bolt and screw holes shall be drilled. Coring will not be permitted to produce these holes.

**ITEM 11670.1080 M - TYPE M LAMPOST, 7.75 METER MOUNTING HEIGHT - 3.05  
METER ARM**

- J. Attachment of luminaire to mast arm. Install a through bolt in the mast through the 51 mm Schedule 40 pipe near the luminaire, as shown on drawings. Attach a short nylon coated steel aircraft cable (3.2 mm diameter coated) between the through-bolt in the mast and the through-bolt at the top of the luminaire. Refer to the Luminaire 150 or 250 Watt High Pressure Sodium Teardrop item for details concerning the through-bolt for the luminaire. The cable should have no slack so as to prevent possible rotation of the top nipple threads and to prevent the luminaire from falling to the ground if any part of the connection should fail.
- K. Mast arm attachment to lamppost. The mast pipe that attaches to the upper shaft section of the lamppost by a cast aluminum 4-way cross coupling shall be extended through the center of the cross coupling and shall partially engage the opposite arm of the cross coupling, as shown on drawings. A 9.5 mm thick cap shall be groove welded on the open end of the mast pipe and ground smooth. A 19 mm hole shall be drilled through the mast pipe at the center of the cross coupling for passage of electrical wires into the mast. Remove all sharp edges.

**METHOD OF MEASUREMENT**

The Type M Lamppost shall be measured as the number of units completely furnished and installed, including all associated mounting hardware and anchor bolts.

**BASIS OF PAYMENT**

The unit price bid for each lamppost shall include the cost of furnishing and installing the lamppost at locations as shown on the drawings.

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**ITEM 11670.1090 M - TYPE M LAMPOST, 7.75 METER MOUNTING HEIGHT -  
TWIN 3.05 METER ARM (DUCTILE IRON)**

**DESCRIPTION**

The work under this section includes furnishing all labor, materials, equipment and components to install Type M Lampposts with Type M Mast Arms for supporting Teardrop type luminaires.

**MATERIALS**

A. **Lamppost.**

1. **General.** The lamppost shall be as shown on New York City Department of Transportation, Division of Street Lighting Standard Drawing H-5260, consisting of a one-piece base and shaft section, intermediate shaft section and twin mast arm. Lamppost style shall be Type M as manufactured by Spring City Electrical Manufacturing Company, Spring City, Pennsylvania, Emery Fixtures Inc., Emporia, Kansas or Visco, Eugene, Oregon or approved equal. The overall height from bottom of base to the center line of the mast arm shall be 8.41 m. The height from bottom of base to luminaire center shall be 7.75 m.

2. **Base and Shaft Section.** The base and shaft section shall be one-piece, heavy wall ductile cast iron per ASTM A536. Minimum acceptable wall thickness shall be 19 mm with a minimum base plate thickness of 32 mm. Minimum acceptable weight shall be 295 kg. Height of section from bottom of base to top of section shall be approximately 4.25 m.

The base shall be 533 mm diameter round and shall have four slotted holes, 76 mm long by 32 mm wide, to accept anchor bolts set for a 381 mm bolt circle pattern. A cast iron access door shall be provided in the base as well as a "New York City" identification label to be located 135 degrees from the center line of the access door as shown on plans.

3. Intermediate shaft section shall be one-piece, approximately 2.67 m long, 114 mm diameter heavy aluminum tubing per ASTM B26-88 using 6061-T6 alloy. Minimum acceptable wall thickness shall be 13 mm.

4. **Twin Mast Arm.** The twin mast arm shall consist of the upper shaft lamppost section, flat stock scroll and luminaire mounting arms. The upper shaft section and luminaire mounting arms shall be standard Schedule 40 aluminum piping per ASTM B26-88 using 6061-T6 alloy. The upper shaft section shall be one piece approximately 2.51 m long, 76 mm diameter. The mounting arm shall consist of 1.80 m, 63.5 mm diameter and 1.30 m, 51 mm diameter pipes. The flat stock scroll shall be aluminum per ASTM B26-88 using 6061-T6 alloy.

All ornamentation furnished to the intermediate shaft and the mast arms shall be constructed from cast aluminum, per ASTM B26-88 using 356-T6 alloy.

5. **Casting.** Casting shall be constructed of aluminum per ASTM B26-88 using 356-T6 alloy. All castings shall be done in a workmanlike manner, which shall result in uniform castings free from abnormal physical qualities, pouring faults, porosity, cracks, blow holes, warping, shrinkage defects, or flaws which affect the strength, value, or suitability of the castings for their intended use. Castings must meet the requirements of Subsection 715-03 of the Standard Specifications.

B. **Mounting Hardware.** With the exception of the anchor bolts, all mounting hardware (bolts, nuts, washers,

**ITEM 11670.1090 M - TYPE M LAMPOST, 7.75 METER MOUNTING HEIGHT -  
TWIN 3.05 METER ARM (DUCTILE IRON)**

screws) shall be stainless steel, ASTM SA-193. The sizes of hardware shall be as indicated on the drawings.

- C. Anchor Bolts. All anchor bolts utilized for lamppost mounting shall conform to the applicable requirements of the NYSDOT Standard Specifications, Section 723-60.

**CONSTRUCTION DETAILS**

- A. Type M lampposts shall be constructed as described herein and as shown on the Standard Drawings and the plans.
- B. Type M lampposts shall be installed at locations as shown on the plans. Attach lampposts on top of the concrete and steel barriers as shown on the plans.
- C. The access door in the base shall be secured by stainless steel tamper resistant round head bolts.
- D. Fabricate and install the shaft extension and twin street light arms in accordance with New York City Department of Transportation Division of Street Lighting Standard Drawing H-5260 and the details shown on Standard Drawing H-5260B. All work shall be performed in accordance with subsections 670-3.01,
- E. A finial shall be provided and installed to the top of the lamppost and shall be secured with (3) 6.35 x 1.25 stainless steel set screws located 120 degrees apart.
- F. A 120 volt twist lock photoelectric control unit and receptacle shall be provided and installed to the top of the finial for lampposts as indicated on drawings. Twist lock type receptacle and supports for plug-in type control unit shall conform to the requirements of NYCDOT, Street Lighting Division Standard Drawing No. H-3731. The photo-electric control unit shall conform to the requirements of the New York State Department of Transportation (NYSDOT) Standard Specifications, Section 723-50.
- G. The New York City identification label on the base of each lamppost shall be stamped in accordance with the requirements of the City of New York, Division of Street Lighting, Specification No. 102, Section VII.
- H. Lamppost shall be prime painted using a hi-solid, low VOC two part recoatable epoxy primer. Finish coat shall consist of two coats of a hi-solid polyurethane low VOC two part top coat.
- I. One 8 x 1.5 tapped hole shall be provided, opposite to the access door in base for installation of a ground lug.
- J. All bolt and screw holes shall be drilled. Coring will not be permitted to produce these holes.
- K. Attachment of luminaire to mast arm. Install a through bolt in the mast through the 51 mm Schedule 40 pipe near the luminaire, as shown on drawings. Attach a short nylon coated steel aircraft cable (3.2 mm diameter coated) between the through-bolt in the mast and the through-bolt at the top of the luminaire. Refer to the Luminaire 150 or 250 Watt High Pressure Sodium Teardrop item for details concerning the through-bolt for the luminaire. The cable should have no slack so as to prevent possible rotation of the top nipple threads and to prevent the luminaire from falling to the ground if any part of the connection should fail.
- L. Mast arm attachment to lamppost. The mast pipe that attaches to the upper shaft section of the lamppost by a cast aluminum 4-way cross coupling shall be extended through the center of the cross coupling and shall partially engage the opposite arm of the cross coupling, as shown on drawings. A 9.5 mm thick cap shall be

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**ITEM 11670.1090 M - TYPE M LAMPOST, 7.75 METER MOUNTING HEIGHT -  
TWIN 3.05 METER ARM (DUCTILE IRON)**

groove welded on the open end of the mast pipe and ground smooth. A 19 mm hole shall be drilled through the mast pipe at the center of the cross coupling for passage of electrical wires into the mast. Remove all sharp edges.

**METHOD OF MEASUREMENT**

The Type M Lamppost shall be measured as the number of units completely furnished and installed, including all associated mounting hardware and anchor bolts.

**BASIS OF PAYMENT**

The unit price bid for each lamppost shall include the cost of furnishing and installing the lamppost at locations as shown on the drawings.

**ITEM 11670.1593 M - TYPE B LAMPPOST**  
**ITEM 11670.159301 M - TYPE B-12 LAMPPOST**

Description:

Under this work, the contractor shall furnish and install all materials required for the installation of Type B or B-12 lampposts in accordance with the plans, complete in place, including the aluminum identification tag.

Materials:

The type of B or B-12 lamppost shall be cast in two pieces - the upper part or column and the lower part or pedestal, as shown on NYCDOT-Division of Street Lighting (DSL) Standard Drawing H-46.

Material shall be gray iron and shall conform to the requirements for Class 20 of the A.S.T.M. Specifications for Gray Iron Casting, Designation A-48, latest revision in effect at the time of invitation to bid.

The cores shall be carefully set and scored, so that cross-sections of all parts shall be of uniform thickness. Castings must be reasonably smooth and even, and must not show the parting lines of the patterns or molds.

Castings shall be made in properly vented molds faced with the best material to give optimum smoothness to the surface, and shall be sand blasted and thoroughly cleaned before painting.

All castings shall be true to form and shall conform to the dimensions shown on the plans. Castings shall be free from blow holes, sand holes, and all other defects. Surfaces shall be reasonably smooth and free from scabs, scales, and fused on sand, with all architectural details sharply defined. Runners, risers, fins, and all other cast-on pieces shall be removed. Castings shall be drilled, tapped, machined where indicated, or where required, to insure a neat, close, and true fit between parts.

The pedestal shall consist of a butt with internal flange, made in one casting. The internal flange shall be provided with four cored slots as shown on DSL Standard Drawing H-46. The bottom of the flange shall be machine faced.

The top and inside of the upper portion of the pedestal shall be machine finished to receive the lower section of the column member. The joint and edges must give a close fit, and the columns and pedestals shall be interchangeable.

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The pedestal shall be provided with a door; it shall be leveled on top and bottom, and shall follow the lines of ornamentation of the pedestal when fitted into place. The door shall be attached to the pedestal with two stainless steel hinges, door and pedestal mortised to receive same, and shall be drilled, tapped fitted, and attached before leaving foundry. Hinges shall be 51 mm x 51 mm butt type. The door shall be close fitting, cast to the curve of the post, and shall mesh with the scheme of ornamentation. Two 12x1.75x25 mm - long socket head machine screws shall be provided for holding the door closed, and 6x1x20 mm - long flat head machine screw shall be provided for the hinges.

The ornamental column shall be a one-piece casting, having an ornamental top and bottom with a fluted section between. The lowest section of the column, which fits into the pedestal, shall have a machine joint and be fabricated in such a manner that the columns and pedestals are interchangeable. The columns when fitted into the pedestal shall be perfectly straight and true. The top of the column shall have dimensions as shown on DSL Standard Drawing H-46 to permit attachment to the top mounted park type luminaire.

All bolts, nuts, washers, and screws used in the assembly of the lampposts shall be of stainless steel, 300 series, 18-8.

The paint used must be anti-graffiti, corrosion resisting, semi-gloss paint.

Paint Characteristics - The protective coating must exhibit the following characteristics:

- \* Exceptional resistance to ultra violet light, road salt compounds, and industrial chemical fumes.
- \* High impact resistance forward and reverse to withstand 992kPa directly without cracking, chipping, or peeling.
- \* Display a water transmission rate of less than .00000005 PERMS.
- \* Bend over 180 degree and 3.75 mm mandrel without cracking.
- \* Suitable for applications in below freezing temperatures.
- \* Resist solvents for removal of graffiti off painted surfaces.
- \* Resist flame or high temperature to 205 degrees Celsius.
- \* Shall possess unique molecular structure suitable for brush, roll or spray application to achieve high quality, general purpose usage, exceptional spreadability and adhesion.

Chemical Composition of Paint - All paint must conform with the following chemical requirements:

- \* Pre-darkened pigments to insure long term gloss and color retention.

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- \* No more than 20 percent Oxal Hexel, 17 percent Butyl Acetate, 3 percent Xylol.
- \* Maximum of 40 percent volatile by volume.
- \* Minimum of 425 degrees Celsius flashpoint.
- \* Formulated with air-out additives for flowability.
- \* Two part aliphatic urethane with a 4 to 1 mixture ratio and absolute minimum of 70 percent solid content.

The materials in the foundation shall be as per N.Y.C.D.O.T. standard drawing # E-3884.

Aluminum tags are to be used on lampposts abutting pedestrian paths. The aluminum tags shall be in accordance with Drawing NYCDOT standard drawing #D-2861. On lampposts abutting highways, streets, or other roadways that permit vehicular traffic, reflective sheeting shall be used. The letters and numbers shall be 44 mm high by 32 mm wide, silver colored on a 70 mm square piece. The background shall be green reverse screened transparent. Catalog #708 or equal. A final clear coating shall be applied to the sheeting.

All materials and equipment used shall be approved by the New York City Department of Transportation Division of Street Lighting before purchase or use.

Construction Details:

The Contractor shall properly finish such portions of all castings as are necessary to assure that such castings shall fit in a neat and satisfactory manner. The lampposts shall be so made and fabricated that pedestals and columns shall be interchangeable without refitting. Painting shall consist of one shop coat of red oxide primer and two black top coats which must match the color of the luminaires and steel picket fence on project. Paint shall cover the entire column including the part of column that fits into the pedestal and the interior part of the pedestal into which the column fits. All painted posts and/or painted surfaces shall be cleaned of all foreign matter, such as loose paint, rust, dirt, and grease before painting.

The reflective sheeting for the aluminum tags shall not be stored longer than one month prior to installation. Application shall be in accordance with the manufacturer's recommendations. The surface of the lamppost shall be free from dirt and grime before application of the reflective sheeting. When temperature is below 15 degrees Celsius the adhesive shall be activated with an approved activator. The tags shall not be applied when the temperature is below freezing. The tags shall be mounted vertically at a height of 1.8 m above the ground. The tags shall face the flow of traffic so that they will be easily readable from a moving vehicle and installed as per NYCDOT Standard Drawing # D-5034.

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**ITEM 11670.1593 M - TYPE B LAMPPOST**  
**ITEM 11670.159301 M - TYPE B-12 LAMPPOST**

When the identification tags cannot be installed because of the nature of the surface to which they are to be attached, the following procedure is to be followed: reflective sheeting tags shall be attached to an aluminum plate large enough to contain all the digits arranged in a vertical position. The plate shall be attached to the surface to be identified by the use of two (2) monel metal or stainless steel, round 25 mm x #8 machine screws for Standard Wood or Parkway Type Wood Posts.

Foundations shall be constructed in accordance with NYCDOT Standard Drawing # E-3884 unless detailed otherwise on the project drawings. Foundations shall be paid for separately under the appropriate item.

All lampposts shall be installed, and the electrical supply lines connected, in conformance with the requirements of the "General Specifications for Street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS-Compiled 1970 for Use with State of New York Department of Transportation Construction Contracts", except as modified on the plans and in the specifications.

**Method of Measurement:**

The quantity to be paid for under these items will be the number of Type B or B-12 lampposts, with all appurtenant equipment, furnished, and installed and painted in accordance with the plans, specifications and as ordered by the Engineer.

**Basis of Payment:**

The unit price bid for each lamppost shall include the cost of all labor, materials and equipment necessary to complete the installation except that the foundation shall be paid for separately under the appropriate item.

**D260298****ITEM 11670.402610 M- CONTROL CABINET, 6 RELAY, FLUSH MOUNTED, 914 mm X 762 mm X 305 mm, AND ELECTRICAL EQUIPMENT (B.E.C.)****Description:**

Under this work, the Contractor shall, where shown on the plans or directed by the Engineer, furnish and install control cabinets with electrical equipment.

**Materials:**

The various components of the control cabinets shall be as specified on Bureau of Electrical Controls's Standard Drawings H-5078 and in conformance with the "General Specifications for Street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS - Compiled 1970 for Use with State of New York Department of Transportation Construction Contracts".

**Construction Details:**

The control cabinets and electrical equipment shall be installed in conformance with the plans, the "General Specifications for Street Lighting Facilities" and Bureau of Electrical Control's Standard Drawing H-5078.

**Method of Measurement:**

This item shall be measured by the number of control cabinets furnished and installed as specified.

**Basis of Payment:**

The unit price bid shall include the cost of the cabinet, frame, door, gaskets, hardware, electric equipment, including photoelectric controls, mounting bracket with adapter, labor and all other materials and equipment necessary to complete the work.

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ITEM 11670.410906 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 150mm x 150mm x 100mm

ITEM 11670.410907 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 610mm x 508mm x 203mm

ITEM 11670.410908 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 406mm x 305mm x 152mm

ITEM 11670.410909 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 300mm x 300mm x 203mm

ITEM 11670.410910 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 610mm x 457mm x 254mm

ITEM 11670.410911 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 305mm x 305x 152mm

ITEM 11670.410912 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 457mm x 305mm x 254mm

ITEM 11670-410913 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 508mm x 610mm x 203mm

ITEM 11670.410914 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 254mm x 254mm x 203mm

ITEM 11670-410915 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 203mm x 203mm x 152mm

**DESCRIPTION:**

Under this item the Contractor shall furnish galvanized steel junction boxes for the purpose of providing conduit junction points and splices for branch circuit wiring

**MATERIALS:**

Boxes shall be hot dipped galvanized steel (min. #12 gauge), NEMA-4 Type.

Box shall be furnished with hinged gasketed cover and positive locking latch.

All electrical equipment shall conform to UL and NEMA requirements.

**CONSTRUCTION DETAILS:**

Contractor shall drill box to receive conduits.

Contractor shall attach box to structure with approved supports.

Any work performed within the boundaries of New York City shall also be in accordance with the "General Specifications for Street Lighting Facilities" contained in the latest publication of "City of New York SPECIFICATIONS For Use With State of New York Department of Transportation

7-97

Revised 12-3-99 (Metric)

Rev. 3/5/02

**ITEM 11670.410906 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 150mm x 150mm x 100mm**

**ITEM 11670.410907 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 610mm x 508mm x 203mm**

**ITEM 11670.410908 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 406mm x 305mm x 152mm**

**ITEM 11670.410909 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 300mm x 300mm x 203mm**

**ITEM 11670.410910 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 610mm x 457mm x 254mm**

**ITEM 11670.410911 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 305mm x 305x 152mm**

**ITEM 11670.410912 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 457mm x 305mm x 254mm**

**ITEM 11670-410913 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 508mm x 610mm x 203mm**

**ITEM 11670.410914 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 254mm x 254mm x 203mm**

**ITEM 11670-410915 M - GALVANIZED STEEL NEMA-4 TYPE JUNCTION BOX  
SURFACE MOUNTED 203mm x 203mm x 152mm**

Construction Contracts." Differences in standards or code requirements shall be resolved as determined by the Engineer.

**METHOD OF MEASUREMENT:**

The quantity to be paid for under this item will be the number of complete junction boxes installed.

**BASIS OF PAYMENT:**

The unit price bid shall cover the cost of the junction boxes including electrical components, hardware, incidentals, labor, equipment and all other materials necessary to complete the work.

**ITEM 670.5301 11 - LUMINAIRE, 250 WATT PULSE START METAL HALIDE  
TEARDROP (NYC)**

**DESCRIPTION**

This work shall consist of furnishing and installing pulse start metal halide teardrop luminaires – 250 watts, as shown on the plans or as directed by the Engineer.

**MATERIALS**

- A. The luminaire shall be approximately 840 mm overall height with a maximum, circular cross section, approximately 400 mm diameter at its widest part, designed for use with a vertically mounted, base up, 250 watt pulse start metal halide lamp, providing an IES (Illuminating Engineering Society) Type III, light distribution. The luminaire shall be UL listed for wet locations, operate at the voltage as indicated on the Contract Drawings, and shall be as specified herein and as manufactured by:

Sentry Electric Corp.  
185 Buffalo Avenue  
Freeport, NY, 11520  
(516) 379-4660

Holophane  
114 Jericho Tpke., Suite 112  
Floral Park, NY 11001  
(516) 775-2720

Magniflood Inc.  
7200 New Horizons Blvd.  
N. Amityville, NY 11701  
(631)226-1000

Spring City Electrical Manufacturing Co.  
Hall and Main Streets  
Spring City, PA 19475  
(610) 948-4000

or approved equal.

- B. The luminaire shall consist of housing with a top mounting assembly containing the electrical components and an optical system with refractor and reflector as shown on applicable NYCDOT Division of Street Lighting standard drawings.
- C. The ballast housing shall be cast aluminum and contain tray-mounted ballast with all starting components and terminal blocks securely attached. All live parts in the ballast housing shall be insulated. The top of the ballast housing shall have a hex shaped, threaded hub for attaching the luminaire to either 38 mm or 51 mm NPT threaded nipple on the mast arm or bracket. A removable, cast aluminum door, safely attached to the ballast housing by stainless steel screws and/or a safety cable shall be provided for the removal of the ballast and interior parts.
- D. The reflector and lamp housing shall be of spun aluminum having a thickness not less than 1.6 mm, and shall contain the lamp reflector, the lamp socket, and the lamp. The top edge of the spun aluminum housing shall be sturdily secured to the cast aluminum ballast housing and the bottom edge to a cast aluminum globe holder. Connections to each casting shall be with at least five 4.8 mm diameter, universal head, aluminum rivets designed for use on soft materials, evenly spaced around the housing edges.
- E. The refractive globe shall be of shock and thermal resistant borosilicate glass with a high transmission factor and formed with a system of light controlling prisms to provide an IES Type III light distribution. The globe surface and housing hinge ring shall have at least one

**ITEM 670.5301 11 - LUMINAIRE, 250 WATT PULSE START METAL HALIDE  
TEARDROP (NYC)**

mark each to indicate either house side or street side light distribution to allow adjustment of the globe for a proper light distribution at the final place of luminaire installation. The globe shall be tightly held against the cast aluminum globe holder by means of at least 4 cast aluminum hold-down clips, stainless steel screws and a stainless steel set screw such that the globe cannot be moved in its holder when closed. The refractor assembly shall be hinged to the hinge ring of the housing and have a means of latching the refractor assembly to the housing.

Hinging arrangement shall allow for easy removal of the refractor assembly and prevent accidental disengagement of the refractor assembly. Latching arrangement shall be such as to prevent relative motion between latch components and accidental opening of the refractor assembly.

A heat, moisture and compressive-set resistant gasket shall be furnished for the globe holder to provide a firm seat and tight seal of the globe when closed.

- F. The lamp socket shall be a porcelain, mogul socket, 4 KV pulse rated, suitable for use with a 250 watt pulse start metal halide lamp, ANSI Code M138. The socket shall have a spring type center contact and sufficient gripping action to prevent backing out of the lamp. The socket shall be adequately supported to the luminaire housing by a means, which serves as a wireway for the socket leads. The socket support shall position the lamp in relation to the refractive globe to produce correct lighting distribution.
- G. The ballast shall be of the constant wattage, auto-transformer type or equal, suitable for the wattage and operating voltage of the luminaire as indicated on the Contract Drawings. The ballast shall be equipped with a polarized quick disconnect plug for the connection of its secondary leads to the lamp socket leads. The ballast shall be capable of starting and operating the lamp at a temperature of minus 30 degrees Celsius.
- H. A 250 watt pulse start metal halide lamp shall be provided with each luminaire as indicated on the Contract Drawings. The entire luminaire shall be completely pre-wired, requiring only the connection of the primary leads to the incoming feeders.
- I. An identification number "NYC- (year)-2PM", and an inscription "Property of New York City" shall be placed on the inside of the luminaire with 13 mm high letters.
- J. The inside surfaces of the luminaire housing shall be painted with black polyester acrylic powder coating and outside surfaces with Federal Color 14056 Green Gloss or color as specified on the Contract Drawings.
- K. Total downward light efficiency shall not be less than 70% with the lamp lumens being directed downward in a controlled Type III light distribution.
- L. Any material or method of installation may be substituted for a material or method of installation specified herein provided that the substitute material or method of installation is

**ITEM 670.5301 11 - LUMINAIRE, 250 WATT PULSE START METAL HALIDE  
TEARDROP (NYC)**

equal to or better than the material or method of installation specified herein subject to approval.

- M. All equipment and installation methods shall be as specified herein or equal approved by the Engineer and the New York City Department of Transportation, Division of Street Lighting.

**CONSTRUCTION DETAILS**

The Contractor shall include but not be limited to, the following work to install the luminaires:

A. Shop Assembly

1. Temporarily shop-assemble the luminaire to the lamppost mast arm or structure-mounted bracket. After the luminaire is hand-tightened, wrench-tighten a minimum of three turns, but no more than four turns such that the side of the hub is perpendicular to the axis of the mast arm. The connecting pipe nipple shall thread into the luminaire hub at least 19 mm.
2. Drill an 8 mm through-hole with axis parallel to and on the same plane with the mast arm or bracket horizontal axis, through the luminaire hub and the engaged nipple. A 6.35 mm stainless steel hex head cap screw will be inserted through the drilled hole for use as the through-bolt to secure the luminaire to the nipple.
3. Clean the reflector and the inside surface of the globe as recommended by the manufacturer. Install a 250 watt pulse start metal halide lamp. Adjust the globe such that the line between the house side marks on the globe surface is perpendicular to the horizontal axis of the mast arm or bracket with the street side part of the globe facing the roadway for roadway lighting or facing the sidewalk for sidewalk lighting. Securely tighten the globe to its holder.
4. Remove the luminaire from the lamppost mast arm or the structure-mounted bracket and clean up any damaged threads on the nipple for field installation of the luminaire. Match-mark all mating pieces for field installation.

B. Field Installation

1. Carefully select the luminaire as match-marked in the shop for installation on the correct lamppost. Tighten the luminaire to the nipple of the lamppost arm with proper thread engagement until the drilled through holes on the hub and nipple are aligned. The installation of the through-bolt requires proper thread engagement to the nipple.
2. Furnish and install a 6.35 mm hex head cap screw with double nuts through the hub and nipple, and attach the safety cable provided on the lamppost mast arm to the luminaire, as indicated on the contract drawings. The screw and nuts shall be type 316 stainless steel.

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**ITEM 670.5301 11 - LUMINAIRE, 250 WATT PULSE START METAL HALIDE  
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3. Make proper wire connections to the luminaire, and securely fasten the ballast-housing door. Gently clean the outside surface of the globe.
- C. The Contractor shall submit to the Engineer for review by the New York City Department of Transportation, Division of Street Lighting, certified photometric test data from an independent testing laboratory, giving the following information:
- Isofootcandle lines of horizontal illumination based on a 7.62 meter mounting height with correction factors for 4.57, 6.10 and 9.14 meter mounting heights on coordinates of transverse distance versus longitudinal distance in units of mounting heights.
  - Coefficient of utilization curve.
  - Maximum plane and maximum cone plots of Candela.
  - House side and street side candela tabulation in polar coordinates with vertical angle versus lateral angle.
- D. The Contractor shall submit to the Engineer for review and approval by New York City Department of Transportation, Division of Street Lighting all shop drawings pertaining to the construction and installation of luminaires for approval.

**METHOD OF MEASUREMENT**

This work will be measured as the actual number of pulse start metal halide teardrop luminaires – 250 watts, satisfactorily furnished and installed.

**BASIS OF PAYMENT**

The unit price bid shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work.

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**ITEM 670.5302 11 - LUMINAIRE, 150 WATT PULSE START METAL HALIDE  
ACORN (NYC)**

**DESCRIPTION**

This work includes furnishing and installing 150 watt, pulse start metal halide acorn luminaires.

**MATERIALS**

- A. The luminaire shall be approximately 525 mm high, overall height with a maximum, circular cross section, approximately 370 mm diameter, designed for use with a vertically mounted, base up, 150 watt pulse start metal halide lamp, ANSI Code M102, Designation 150W/U/ED28/PS, providing an IES (Illuminating Engineering Society) Type V, light distribution. The luminaire shall be UL listed for wet locations, operate at the voltage as indicated on drawings, and shall be as specified herein and as manufactured by:

Sentry Electric Corp.	Holophane	Magniflood Inc.
185 Buffalo Avenue	114 Jericho Tpke., Suite 112	7200 New Horizons Blvd.
Freeport, NY, 11520	Floral Park, NY 11001	N. Amityville, NY 11701
(516) 379-4660	(516) 775-2720	(631)226-1000

Spring City Electrical Manufacturing Co.  
Hall and Main Streets  
Spring City, PA 19475  
(610) 948-4000

or equal approved by the Engineer and NYCDOT - DSL.

- B. The luminaire shall consist of housing with top mounting assembly containing the electrical components and an optical system with refractor and reflector as shown on the applicable NYCDOT Division of Street Lighting standard drawings.
- C. The ballast housing shall be cast aluminum and contain tray-mounted ballast with all starting components and terminal blocks securely attached. All live parts in the ballast housing shall be insulated. The top of the ballast housing shall have a hex shaped; threaded hub for attaching the luminaire to 51 mm NPT threaded nipple on the support arm. A removable, cast aluminum door safely attached to the ballast housing by stainless steel screws and/or a safety cable shall be provided for the removal of the ballast and interior parts.
- D. The reflector and lamp housing shall be of spun aluminum having a thickness not less than 1.6 mm, containing the lamp reflector, the lamp socket, and the lamp. The top edge of the spun aluminum housing shall be sturdily secured to the cast aluminum ballast housing and the bottom to a cast aluminum globe holder. Connections to each casting shall be with at least five 4.8 mm diameter, universal head, aluminum rivets designed for use on soft materials, evenly spaced around the housing edges.

**ITEM 670.5302 11 - LUMINAIRE, 150 WATT PULSE START METAL HALIDE  
ACORN (NYC)**

- E. The refractive globe shall be injection-molded, clear polycarbonate, prismatic with an IES Type V light distribution. The globe surface and hinge ring of housing shall have at least one mark each to indicate either house side or street side light distribution to allow adjustment of the globe for a proper light distribution at the final installation of the luminaire. The globe shall be tightly held against the cast aluminum globe holder by means of at least 4 cast aluminum hold-down clips and stainless steel screws and a stainless steel set screw such that the globe cannot be moved in its holder, when closed. The refractor assembly shall be hinged to the hinge ring of the housing and have a means of latching the refractor assembly to the housing.

Hinging arrangement shall allow for easy removal of the refractor assembly and prevent accidental disengagement of the refractor assembly. Latching arrangement shall be such as to prevent relative motion between latch components and accidental opening of the refractor assembly.

A heat, moisture and compressive-set resistant gasket shall be furnished for the globe holder to provide a firm seat and tight seal of the globe when closed.

- F. The lamp socket shall be a porcelain, mogul socket, 4KV pulse rated, suitable for use with a 150 watt pulse start metal halide lamp, ANSI Code M102, Designation 150W/U/ED28/PS, The socket shall have a spring type center contact, and sufficient gripping action to prevent backing out of the lamp. The socket shall be adequately supported to the luminaire housing by a means, which serves as a wireway for the socket leads. The socket support shall position the lamp in relation to the refractive globe to produce correct lighting distribution.
- G. The ballast shall be of the constant wattage, auto-transformer type or equal, suitable for the wattage and operating voltage of the luminaire as indicated on drawings. The ballast shall be equipped with a polarized quick disconnect plug for the connection of its secondary leads to the lamp socket leads. The ballast shall be capable of starting and operating the lamp at a temperature of minus 30 degrees Celsius.
- H. A 150 watt pulse start metal halide lamp shall be provided for each sidewalk luminaire, as indicated on drawings. The entire luminaire shall be completely pre-wired, requiring only the connection of the primary leads to the incoming feeders.
- I. An identification number "NYC- (year)-15PM", and an inscription "Property of New York City" shall be placed on the inside of the luminaire with 13 mm high letters.
- J. The inside and outside surfaces of the luminaire housing shall be painted with black polyester acrylic powder coating or with color as called for on the drawings.

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**ITEM 670.5302 11 - LUMINAIRE, 150 WATT PULSE START METAL HALIDE  
ACORN (NYC)**

- K. Total downward light efficiency shall not be less than 70% with the lamp lumens being directed downward in a controlled Type V light distribution.
- L. Any material or method of installation may be substituted for a material or method of installation specified herein provided that the substitute material or method of installation is equal to or better than the material or method of installation specified herein subject to approval.
- M. All equipment and method of installation shall be as specified herein or approved equal.

**CONSTRUCTION DETAILS**

The Contractor's work shall include but not be limited to, the following work to install the luminaires:

**A. Shop Assembly.**

1. Temporarily shop assemble the luminaire to the lamppost arm or structure-mounted bracket. After the luminaire is hand-tightened, wrench-tighten a minimum of three turns, but no more than four turns such that the side of the hub is perpendicular to the axis of the mast arm. The connecting pipe nipple shall thread into the luminaire hub at least 19 mm.
2. Drill an 8 mm through-hole with axis parallel to and on the same plane with the mast arm or bracket horizontal axis, through the luminaire hub and the engaged nipple. A 6.35 mm stainless steel hex head cap screw will be inserted through the drilled hole for use as through-bolt to secure the luminaire to the nipple.
3. Clean the reflector and the inside surface of the globe as recommended by the manufacturer. Install a 150 watt pulse start metal halide lamp. Adjust the globe such that the line between the house side marks on the globe surface is perpendicular to the horizontal axis of the arm or bracket with the street side part of the globe facing the sidewalk (for sidewalk lighting). Securely tighten the globe to its holder.
4. Remove the luminaire from the support arm and clean up any damaged threads on the nipple for field installation of the luminaire. Match-mark all mating pieces for field installation.

**B. Field Installation**

1. Carefully select the luminaire as match-marked in the shop for installation on the correct lamppost. Tighten the luminaire to the nipple of the support arm with proper

**ITEM 670.5302 11 - LUMINAIRE, 150 WATT PULSE START METAL HALIDE  
ACORN (NYC)**

thread engagement until the drilled through holes on the hub and nipple are aligned; the installation of the through-bolt requires proper thread engagement to the nipple.

2. Furnish and install a 6.35 mm hex head cap screw with double nuts through the hub and nipple, and attach the safety cable provided on the support arm to the luminaire, as indicated on drawings. The screw and nuts shall be type 316 stainless steel.
  3. Make proper wire connections to the luminaire, and securely fasten the ballast-housing door. Gently clean the outside surface of the globe.
- C. The Contractor shall submit to the New York City Department of Transportation, Division of Street Lighting certified photometric test data from an independent testing laboratory, giving the following information:
- Isofootcandle lines of horizontal illumination based on a 7.62 meter mounting height with correction factors for 3.65, 4.57, and 6.10 meter mounting heights on coordinates of transverse distance versus longitudinal distance in units of mounting heights.
  - Coefficient of utilization curve.
  - Maximum plane and maximum cone plots of Candela.
  - House side and street side candela tabulation represented in polar coordinates with vertical angle versus lateral angle.
- D. The Contractor shall submit all shop drawings pertaining to the construction and installation of luminaire to the Engineer for review and approval by NYCDOT, Division of Street Lighting.

**METHOD OF MEASUREMENT**

The 150 watt pulse start metal halide, acorn luminaire will be measured by the number of units furnished and installed on lampposts or brackets.

**BASIS OF PAYMENT**

The unit price bid for each luminaire shall include the cost of furnishing all labor, materials, and equipment for a complete installation as specified herein and as shown on Contract Drawings.

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**ITEM 11670.6001 M - FURNISH PHOTOELECTRIC CONTROL UNIT (BUREAU OF GAS AND ELECTRICITY)**

**Description:**

The Contractor shall furnish photoelectric control units at the locations designated on the plans, in accordance with the specifications, and as ordered by the Engineer.

**Materials:**

The materials shall conform to the requirements of the "General Specifications for Street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS - Compiled 1970, for Use with State of New York Department of Transportation Construction Contracts," except as modified on the plans and in the specifications.

The complete photoelectric control unit shall consist of a chassis on which is mounted the light sensitive element or cell adjustment controls, necessary components, appliances and wiring or circuiting. This chassis and assembly shall be enclosed in a housing of corrosion resistant metal or plastic. The complete enclosure shall be weatherproof and shall be assembled so as to provide a one piece construction for ease of handling. A base shall be provided to prevent rain and snow from entering the female part of the attachment receptacle. Base may be of same material as housing provided base and housing are furnished as a complete unit. The photoelectric control unit shall operate satisfactorily between 115 to 125 volts; 60 cycles, A.C. input voltage, and shall be designed to operate in a vertical position. The power consumption shall be maximal 6 watts at 120 volts or less.

The unit shall have a load switch consisting of a single throw, normally closed contact, switching device rated at 15 amperes continuous load. Its carrying capacity shall be such that it will carry this load without undue heating. At 120 volts, 60 cycles, the contacts shall be capable of making and breaking a 15 ampere incandescent lamp load or a 12.5 ampere mercury vapor or high pressure sodium vapor lamp load together with its associated ballast and transformer equipment without excessive arcing. The controlled lighting load will remain or become energized in the event of functional failure of the components.

The photoelectric control shall be calibrated by comparison with a light standard or calibration photometer. The light level control feature of the photoelectric control shall be set so that it will turn on when the intensity of the light from the north sky produces a level of illumination equal to 10 lux. Turn-off shall be set to the point when the intensity of the light from the north sky produces a level of illumination equal to 10 lux within 10%±. A locking arrangement for sensitivity must be provided. The calibration of the photoelectric control unit must be done using laboratory conditions.

**ITEM 11670.6001 M - FURNISH PHOTOELECTRIC CONTROL UNIT (BUREAU OF GAS AND ELECTRICITY)**

A time delay of 20 seconds minimum and 120 seconds maximum shall be incorporated in the circuit to prevent the controlled lights from being turned off at night by transient lights which might focus on the control, or by lightning flashes.

Only the highest quality components shall be used in the construction of the control. These components shall be underloaded to assure long life. All parts shall be pre-aged, if necessary, for satisfactory operation, and tested before installation into the control unit. Capacitors shall have paper, mica, or ceramic dielectrics. No electrolytic capacitors will be approved. The light sensitive element shall be a cadmium sulfide or other approved solid state device.

The attachment fitting shall be the male part of a 3 wire, 15 ampere, 120 volt "Twist-Lock Type Receptacle," and interchangeable therewith without any additional parts being necessary. The exposed metal parts shall have a corrosion resisting plating having good electrical conductivity. The current carrying parts shall have solid metal to metal contacts, i.e., rivets, eyelets or similar, shall not depend on the insulating body to assure contact. The use of machine screws will not be permitted.

The photoelectric control unit shall operate in a satisfactory manner in the climatic conditions prevailing in the City of New York, and incorporate the same positive time delay at ambient or conducted temperatures from minus 38° to plus 77° C.

All parts of the photoelectric control assembly shall be constructed of corrosion resistant materials and/or treated in such a manner so that they will not deteriorate in the climatic conditions prevailing in the City of New York. The complete assembly is to be as small as practical but must fit within the plastic or metallic housing, and be sufficiently rugged so as to not require special handling. The photoelectric control unit shall be so constructed that it can be removed as a unit without disconnecting any wires.

The photoelectric control unit shall be interchangeable with other photoelectric control units now in use by the City of New York, without any additional parts being necessary.

A surge protector with a range of from 450 V RMS to 4000 V RMS shall be provided to protect the device against damages by high voltages. If two stages of surge protectors are to be used, the overlap between low voltage surge protector and high voltage protector shall be of sufficient magnitude to avoid all dangerous areas of nonfunction. No carbonizing material shall be used in the path of current and cause a conductive path. In a gap type arrestor the metal parts shall resist material transfer when actuated. There shall be no electrical connection in the control or surge protector which could be adversely affected by being spaced by, at or mounted on insulators having different coefficients of expansion than the materials supported.

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**ITEM 11670.6001 M - FURNISH PHOTOELECTRIC CONTROL UNIT (BUREAU OF GAS AND ELECTRICITY)**

The Contractor shall supply a certified test report by an independent laboratory on twelve (12) units and indicate the results of the following tests:

1. The lux values of illumination at the time of turn-on and turn-off operation for each unit on test, for the continuous period of 30 days operation. Units should be tested simultaneously under the same values of illumination for comparison purposes.
2. The load switching device shall be subjected to 4000 consecutive switching operations of a cold 15 ampere incandescent lamp load, without failure or deterioration of the contacts.
3. All components shall withstand a dielectric test of 1500 V RMS for 1 minute, with the exception of the photocell which should withstand a test voltage of 500 V RMS for 1 minute in complete darkness.
4. The maximum dark current measurable with the control energized with 120 V AC, shall be 0.50 milliamperes.
5. Test procedure for surge protector. The testing device shall consist of a twist-lock receptacle. This receptacle shall be connected to a power line of 120 volts, 60 cycles A.C. with leads of No. 10 wire not in excess of 4.5 m in length each. A surge registering 4000 volt peak and a half value time of 40 micro seconds minimum shall be available at the terminal of the test receptacle with the power line connected. The load terminal of the testing receptacle shall be connected to an incandescent lamp load of not less than 500 watts. The photocontrol to be tested shall then be inserted in the test receptacle. The photo-conductive cell shall be covered and be in complete darkness. Under these conditions the control shall withstand at least 10 consecutive tests of applied surge without changing the original setting by more than plus or minus 25%.

If the manufacturer of the photoelectric control unit warrants the equipment he shall supply the Contractor with a warranty for the unit produced under this specification. The warranty shall be made out in the name of the State of New York and shall have the expiration date clearly stated on it.

**Construction Details:**

Not specified.

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**ITEM 11670.6001 M - FURNISH PHOTOELECTRIC CONTROL UNIT (BUREAU OF GAS AND ELECTRICITY)**

**Method of Measurement:**

This item shall be measured by the number of photoelectric control units furnished in accordance with the plans, specifications and orders of the Engineer.

**Basis of Payment:**

The unit price bid per photoelectric control unit shall include the cost of all materials necessary to complete the work.

The male portion of the twist-lock receptacle shall not be provided under this item.

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**ITEM 11670.6002M - INSTALL PHOTOELECTRIC CONTROL UNIT (BUREAU OF GAS AND ELECTRICITY)**

**Description:**

The Contractor shall install photoelectric control units at the locations designated on the plans, in accordance with the specifications, and as ordered by the Engineer.

**Construction Details:**

The photoelectric control unit shall be installed in conformance with the requirements of the "General Specifications for Street Lighting Facilities" contained in the publication "City of New York SPECIFICATIONS - for Use with State of New York Department of Transportation Construction Contracts," except as modified on the plans and in the specifications.

**Method of Measurement:**

This item shall be measured by the number of photoelectric control units installed in accordance with the plans, specifications and orders of the Engineer.

**Basis of Payment:**

The unit price bid per photoelectric control unit shall include the cost of all labor and equipment necessary to complete the installation.