STREET LIGHTING SPECIAL PROVISIONS

October 6, 2026

BOSTON PUBLIC WORKS DEPARTMENT
STREET LIGHTING DIVISION

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SECTION A

GENERAL REQUIREMENTS FOR STREET LIGHTING INSTALLATIONS

GENERAL

The work under this Section shall consist of installing various components of a municipally-owned street lighting system. The City of Boston Street Lighting Division shall have the final decision regarding all disputes on materials and workmanship.

All underground installations, including any required wiring, must be completed before the finished surface is placed on the roadways and sidewalk. This shall include all work, including all excavations in roadways and sidewalks for the installation of conduit, pullboxes, and bases.

All electrical equipment, materials and installation shall conform to the latest standards and specifications, which are on file with the Boston Public Works Department (PWD), Street Lighting Division – Engineering, 430A Canterbury Street, Roslindale, 02131, and are hereby made a part of these Special Provisions. All electrical equipment and materials shall be designed, manufactured, tested, and rated to conform to the latest requirements, issues, and revisions of the National Electric Code (NEC), Federal Specifications, the National Electrical Manufacturers Association (NEMA), the Underwriters Laboratories, Inc. (UL), the American Society for Testing and Materials (ASTM), the American National Standards Institute (ANSI), and the American Institute of Electrical Engineers (AIEE).

All material must have the name or trademark of the manufacturer stamped thereon, where such identification is customary.

Shop Drawings shall be submitted for approval to the Engineer for the following materials:

Street Light Posts
Luminaires and Accessories
Control Cabinet
Panel Board Electrical Equipment
Connectors and Fuses
Post Accessories
Lamps
Photoelectric Controls
Bases
Pullboxes and Extenders
Street Lighting Cable

Exterior lighting systems utilizing light emitting diode (LED) type luminaires shall be provided in accordance with the procedures found in AASHTO Publication GL Roadway Lighting Design Guide, latest edition and the other reference publications listed below. Power Distribution Systems shall be provided in accordance with standard industry practice and The City of Boston codes. All material and installation practices shall be in compliance with the recommended practices in the reference publications.

Reference Publications

Unless otherwise noted, all publications in this Manual shall refer to the latest edition.

- Roadway Lighting Design Guide. AASHTO Publication GL, American Association of State Highway and Transportation Officials (AASHTO).
- Recommended Practice for Design and Maintenance of Roadway and Parking Facility Lighting. Publication Number RP-8, Illuminating Engineering Society (IES) and American National Standards Institute (ANSI).
- FHWA Lighting Handbook. Federal Highway Administration (FHWA).
- National Electrical Code. Publication Number NFPA 70, National Fire Protection Association (NFPA).
- The National Electrical Safety Code (NESC). Publication C2, Institute of Electrical and Electronics Engineers Standards Association (IEEE SA).

The Contractor is responsible for all equipment until final acceptance of the Contract, and for all damage from any cause whatsoever.

When installing a complete lighting system, all new lighting posts, luminaires, wiring, and associated equipment must be installed and completely operational prior to any deactivation and removal of existing lighting units. Under **NO CONDITIONS** shall any affected area be left unlighted for any period of time. If the existing lighting cannot remain during construction, the Contractor may request, in writing, to install temporary lighting in the affected area at his own expense (unless specified in the Contract). This request shall include luminaire type, spacing, wiring configuration, and power source. If this request is approved by the Engineer, the temporary lighting must be completely installed and operational before any deactivation of existing lights shall be allowed.

The Contractor shall be responsible for coordinating the deactivation of any lighting systems by the Street Lighting Division and Eversource, where applicable. It shall be the Contractor's responsibility for coordination and scheduling of any such work done by others.

It should be noted that the Street Lighting Plans are schematic and the Contractor shall install the equipment as shown on the City of Boston Public Works Department (PWD) Standard Street Lighting Division Special Provisions and the Contract Drawings.

No payments will be made for relocations required because of improper installation by the Contractor.

REGULATIONS

The Contractor shall comply with the regulations of all authorities having jurisdiction over electrical work, shall arrange for all inspections that may be required by the City of Boston or Eversource, shall obtain all permits and certificates at his own expense, and shall deliver to the Engineer certificates of acceptance of work.

The Contractor shall comply with all standards and regulations of the various City of Boston agencies, the Street Lighting Division, and Eversource governing all materials and methods of construction.

ELECTRICAL SERVICES

Electrical Service to each street lighting control cabinet will be provided by Eversource. Eversource will install cable from the manhole as shown on the plans. The Contractor is required to install the control cabinet before any other lighting work shall be performed.

The Contractor will be responsible for coordinating the Eversource work in the vicinity of the control cabinet(s) for installation of electrical service to control cabinet(s). The Contractor shall notify Eversource that construction has started and shall be responsible for coordinating and scheduling all work to be performed by Eversource. Under no conditions shall the Contractor permanently patch the sidewalk or roadway, or apply the final roadway surface, until services to the control cabinets have been completed.

Connections to Existing City-owned Lighting System

The Contractor shall use extreme care in making all connections to an existing City-owned lighting system. The existing system shall not be damaged or disrupted in any manner. New connections will be made to energized lighting systems, and the Contractor is advised that a hazard to the system or to his personnel will exist due to live conductors in pullboxes.

No removal of existing lighting systems, electric cable, connections to or disconnection from existing systems shall be ~~made~~ performed by the Contractor unless directed by the Street Lighting Division.

SECTION B

UNDERGROUND INSTALLATION ASSEMBLIES

ITEM 804.22	2-INCH ELECTRICAL CONDUIT, TYPE NM, PLASTIC - (UL) (MS)	LINEAR FOOT
ITEM 804.33	3-INCH ELECTRICAL CONDUIT, TYPE NM, PLASTIC - (UL) (MS)	LINEAR FOOT
ITEM 804.333	2-INCH OR 3-INCH ELECTRICAL CONDUIT, TYPE NM, PLASTIC - (UL) (MS) IN SAME TRENCH	LINEAR FOOT

GENERAL

Work under these items shall conform to the relevant portions of MassDOT Standard Specifications Subsection 801, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The work under these items shall consist of furnishing and installing various types and sizes of electrical conduits for street lighting system as shown on the plans or as directed, complete in place.

MATERIALS

The details of the single conduit trenches in sidewalks and multiple conduit trenches in sidewalks and roadways are included on the Boston Street Lighting Standards, Details U.1.1 and U.1.2.

Rigid Plastic Conduit

Conduit of the sizes shown on the plans shall be new grey heavy wall rigid plastic conduit of homogeneous polyvinyl chloride (PVC) construction with standard wall thickness. The conduit must conform to NEMA Standards Publication TC-2 for Schedule 80 type EPC Conduit. A 3/8 inch polypropylene pull rope must be installed in conduits not to be used immediately.

The rigid plastic conduit must conform to and meet all current requirements and testing procedures of the American Society of Testing and Materials (ASTM) whenever such standards and test ~~shall~~ apply. The following ASTM standards shall apply as applicable:

ASTM Specification D1784 - Schedule 80 - Extra Heavy Wall Rigid Plastic Conduit

ASTM Specification D2564 - Specification for Solvent Cements for PVC Plastic Pipe & Fittings

Couplings and Fittings

Conduit couplings shall be constructed of PVC rigid plastic formed to fit the outside diameter of the conduit, to be used in conjunction with a heavy-bodied solvent cement as shown in Detail U.1.3.

ASTM Specification D2564 - Specifications for Solvent Cements for PVC Plastic Pipe and Fittings.

Conduit duct bell ends shall be PVC rigid plastic approved by Underwriters' Laboratories, Inc. for use on threadless rigid plastic conduit, to be used in conjunction with a heavy bodied solvent cement.

CONSTRUCTION METHODS

The PVC conduit shall be enveloped in sand or concrete as called for in the plans and details, or as directed by the Engineer.

All installed conduit shall have warning tape installed above the conduit.

Conduits in the same trench shall be used when the Contractor installs multiple lighting and traffic signal conduits, utilizing one trench excavation for all conduits. The Contractor shall maintain the required spacing between all conduits.

Plastic conduits entering concrete pullboxes shall be terminated 1-1/2 inches inside the wall of the pullbox and shall have attached a duct bell end of the required size, using the solvent cement as called for above.

All conduit installed in pullboxes shall be installed in knockouts provided in the box and no excess knockouts shall be made. The knockouts are designed to be made prior to backfilling around the pullboxes. After the conduit has been installed in the pullbox, the open space between the box and the conduit will be sealed with Class B cement concrete masonry. Any conduit installed in such a manner as to block complete access to any other conduit shall be removed and reset. The Contractor shall immediately repair any damage to existing pullboxes caused by construction operations.

Unless directed by the Engineer, the following shall apply regarding installation of conduit:

Conduit from pullbox to pullbox shall be 3” schedule 80 PVC.
Conduit from pullbox to light base shall be 2” schedule 80 PVC.

Conduit from Street Lighting Controller to Eversource Manhole shall be 2” schedule 80 PVC.

METHOD OF MEASUREMENT

2-Inch Electrical Conduit, Type NM, Plastic – (UL) (Municipal Standard) and 3-Inch Electrical Conduit, Type NM, Plastic – (UL) (Municipal Standard) will be measured for payment by the linear foot, along the centerline of the conduit from outside to outside of pullboxes/bases, complete in place. Measurement will include the first conduit to be placed in the trench.

2-Inch or 3-Inch Electrical Conduit, Type NM, Plastic – (UL) (MS) In Same Trench will be measured for payment by the linear foot, along the centerline of the center conduit from

outside to outside of pullboxes/light bases, complete in place. Measurement will include each additional conduit placed in the trench after the first.

BASIS OF PAYMENT

2-Inch Electrical Conduit, Type NM, Plastic – (UL) (Municipal Standard) and 3-Inch Electrical Conduit, Type NM, Plastic – (UL) (Municipal Standard) will be paid for at the Contract unit price per linear foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for sawcutting, furnishing and installing conduit, fittings, bends, clamps, couplings and caps, trench excavation (except rock), de-watering, pull ropes and underground warning tape, but all costs in connection therewith shall be included in the Contract unit price bid.

2-Inch or 3-Inch Electrical Conduit, Type NM, Plastic - (UL) (MS) In Same Trench will be paid for at the Contract unit price per linear foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for sawcutting, furnishing and installing conduit, fittings, bends, clamps, couplings and caps, trench excavation (except rock), de-watering, pull ropes and underground warning tape, but all costs in connection therewith shall be included in the Contract unit price.

Sand for bedding, where required, will be paid for under Item 154.01, Sand for Conduit Trench.

Concrete encasement, where required, will be paid for under Item 431.1 High Early Strength Cement Concrete Base Course.

Gravel for backfill will be paid for under Item 151.02, Gravel.

Surface material restoration will be paid for under the appropriate pay item for the material (asphalt, concrete, brick, etc.).

ITEM 811.331 PULLBOX PRECAST 12” X 24” (MUNICIPAL STANDARD) EACH
ITEM 811.332 PULLBOX PRECAST SHORT 12” X 24” (MUNICIPAL STANDARD) EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 801 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The work under these items shall consist of furnishing and installing 12” x 24” pullboxes and frames and covers for street lighting as shown on the plans or as directed complete in place.

MATERIALS

The details of the precast concrete pullboxes are included on the Boston Street Lighting Standards, Details U.2.1, U.2.2, U.5.1, U.5.2, U.5.3, U.5.4, U.5.5, U.5.6, U.5.7, U.5.8 and U.5.9. The complete specifications (PBCCRD-200, PBCCSD-100, CCFCCPB-100, and CCIFCIGBP-200) are on file at the City of Boston Street Lighting Division and are hereby made a part of this specification.

Sidewalk Frames and Covers shall be constructed of composite concrete and shall be non-conductive consisted with Boston Street Lighting Standards, Detail U.4.1. The composite frame and cover is to be used in **ALL** sidewalk applications. This frame and cover can be purchased in the standard City of Boston Grey for concrete sidewalk applications and Boston City Hall Brick Red for brick sidewalk applications using reinforced composite concrete of monolithic construction, as per Specification CCFCCPB-100. These frames and covers do not require a ground lug or ground wire. The cover shall have ‘BOSTON LIGHTING’ imprinted in lettering (size of lettering shall be indicated on the Details provided on the Boston Street Lighting Standards). Cast iron frames and covers consistent with Boston Street Lighting Standards, Detail U.4.2, shall be required for pullboxes installed in the roadway.

CONSTRUCTION METHODS

All pullboxes must be installed as shown on the plans to the approved grade or as approved to meet field conditions. The top of the frame and cover shall be set flush with the finished grade. The top of the pullbox must be level.

The pullbox shall be positioned using an approved grade so that the cover will be flush with the finished grade of the surface. Provisions have been made for some adjustment of the frame and cover using a single course of brick, with a cement mortar mix used to close the opening between the frame and pullbox to prevent moisture or contaminants from entering the pullbox. Under no condition can any portion of the pullbox be removed to allow adjustment of the frame and cover to the established grade. Boxes requiring more than one course of brick shall be reset to the proper grade.

The Contractor shall furnish and install four 3/4" galvanized steel bolts of a length necessary to properly secure the frame to the pullbox. The bolts shall initially be installed to prevent displacement of the frame from the pullbox while also allowing for proper adjustment of frame and cover as necessary.

The Cast Iron pullbox frame and cover shall be grounded. This shall be accomplished by installing a split top bolt grounding connector suitable to accommodate one bare #4 stranded copper grounding wire in the drilled and tapped 3/8 X 16NC hole.

A 5/8" x 8' long ground rod, a grounding clamp, and 42" of bare #4AWG wire are required in each pullbox for proper grounding. The bare # 4AWG wire shall be connected to the ground lug on the ground rod and to the split top bolt grounding connector in the pullbox frame.

The pullbox shall be left free and clear from dirt or foreign matter. The pullbox shall be set on a gravel bed and gravel backfill shall be provided as required.

Short Pullboxes Installed with Pullbox Extenders

When a short pullbox with a pullbox extender is to be installed, depth of excavation for the shallow depth pullbox with extender must be increased by six (6) inches to thirty-one (31) inches deep. The mortar mix shall be placed between the extender and the pullbox to ensure an even transfer of load. The extender shall then be installed atop the pullbox; pass 3/4" galvanized threaded rods through the PVC sleeves and screw the rods into the pullbox threaded inserts. The frame and cover are to be installed level with the proposed grade. Leveling the frame must be done with no more than one course of brick. The brick course (if required) and frame shall be set with a cement mortar mix to prevent moisture and contaminants from entering the pullbox. Under no circumstances shall any portion of the pullbox or the pullbox extender be removed or modified to facilitate leveling the frame. If frames and covers require more than one course of brick to meet the established grade, the Contractor shall reset the pullboxes and extenders to the proper grade. When the frame has been leveled, the galvanized threaded rods shall be cut at a point one (1) inch less than the top of the frame. The frame shall then be secured by heavy galvanized nuts screwed tightly on the threaded rods.

METHOD OF MEASUREMENT

Pullbox Precast 12” X 24” (Municipal Standard) and Pullbox Precast Short 12” X 24” (Municipal Standard) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Pullbox Precast 12” X 24” (Municipal Standard) and Pullbox Precast Short 12” X 24” (Municipal Standard) shall be paid for at the respective contract unit prices for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for sawcutting, excavation (except rock), furnishing and installing pullboxes, frames and covers, brick, cement mortar mix,

galvanized threaded rods and heavy galvanized nuts, ground rod, clamp and wire, frame and cover grounding lug and bare wire to the grounding rod and leveling the frame, but all costs in connection therewith shall be included in the Contract unit price bid.

6” pullbox extenders will be paid for under Item 811.341, Precast Concrete Pullbox Extender – 6”.

3” pullbox extenders will be paid for under Item 811.342, Precast Concrete Pullbox Extender – 3”.

Gravel bed and backfill will be paid for under Item 151.02, Gravel.

ITEM 811.341	PRECAST CONCRETE PULLBOX EXTENDER – 6” (MUNICIPAL STANDARD)	EACH
ITEM 811.342	PRECAST CONCRETE PULLBOX EXTENDER – 3” (MUNICIPAL STANDARD)	EACH

GENERAL

Work under these items shall conform to the relevant portions of MassDOT Standard Specifications Subsection 801, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

MATERIALS

The details of the precast concrete pullbox extenders are included on the Boston Street Lighting Standards, Details U.3.1 and U.3.2. The complete specifications (PBE-100-6, PBE-100-3) are on file at the City of Boston Street Lighting Division and are hereby made a part of this specification.

CONSTRUCTION METHODS

Extenders must be installed on all pullboxes installed in the short pullbox or where directed by the Engineer. The extender will be set on a mortar bed connected to the pullbox by 3/4 inch threaded galvanized rods, galvanized nuts and washers.

METHOD OF MEASUREMENT

Precast Concrete Pullbox Extender – 6” (Municipal Standard) and Precast Concrete Pullbox Extender – 3” (Municipal Standard) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Precast Concrete Pullbox Extender – 6” (Municipal Standard) and Precast Concrete Pullbox Extender – 3” (Municipal Standard) will be paid for at the respective contract unit prices for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 811.351 PULLBOX ADJUSTED EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsections 801 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of adjusting the frame and cover on an existing precast concrete pullbox so that the cover will be flush with the approved finished grade. If necessary, the Contractor shall remove any existing precast concrete pullbox extender at the direction of the Engineer.

Work shall include the following:

- Remove and reset the existing frame and cover.
- Remove and transport existing pullbox extenders, that are deemed to be in usable condition by the Engineer, to the Street Lighting Facility at 430A Canterbury Street, Roslindale, 02131, or remove and install a new pullbox extender on a pullbox designated by the Engineer.

CONSTRUCTION METHODS

Construction methods for resetting frame and cover shall conform to the relevant provisions of Items 811.331, 811.332, 811.341, and 811.342.

METHOD OF MEASUREMENT

Pullbox Adjusted will be measured for payment by each unit adjusted.

BASIS OF PAYMENT

Pullbox Adjusted will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for excavation, removing and resetting frame and cover, removing and delivering or removing and installing pullbox extenders, brick, cement mortar mix, galvanized threaded rods, heavy galvanized nuts, and leveling the frame, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 811.363 PULLBOX FRAME AND COVER (SIDEWALK) REMOVE AND REPLACE EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 801 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of removing and replacing existing sidewalk frame(s) and cover(s) and installing new composite concrete frame and cover in sidewalk areas only.

MATERIALS

Sidewalk Frames and Covers shall be constructed of composite concrete and shall be non-conductive, as per Specification CCFCCPB-I00. This frame and cover is to be used in **ALL** sidewalk applications. This frame and cover can be purchased in the standard City of Boston Grey for concrete sidewalk application and Boston City Hall Brick Red for brick sidewalk application. These frames and covers require a grounding lug and wires connecting to the existing ground rod. The cover shall have 'BOSTON LIGHTING' imprinted in lettering (size of lettering shall be indicated on the Details provided on the Boston Street Lighting Standards). The details of this frame and cover are included on the Boston Street Lighting Standards, Detail U.4.1.

CONSTRUCTION METHODS

The existing cast iron street lighting frame and cover shall be removed and discarded by the Contractor. The Contractor shall then proceed to install the new composite concrete frame and cover in a bed of mortar on the existing pullbox. The frame and cover shall be properly secured to the existing pullbox using the securing bolts provided by the manufacturer of the composite frame and cover. The new pullbox frame and cover shall be set to the appropriate level so that the top of the frame will be at grade with the proposed sidewalk.

METHOD OF MEASUREMENT

Pullbox Frame and Cover (Sidewalk) Remove and Replace will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Pullbox Frame and Cover (Sidewalk) Remove and Replace will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 811.365 PULLBOX FRAME AND COVER (ROADWAY) REMOVE AND REPLACE EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 801 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of removing an existing pullbox frame and cover and installing a new cast iron frame and cover in roadway areas only.

MATERIALS

The details of these frames and covers are included on the Boston Street Lighting Standards, Detail U.4.2.

Pullbox Frames and Covers for use in roadways shall be constructed of cast iron, capable of handling H-20 traffic loading. These frames and covers require a grounding lug and wires connecting to the existing ground rod. The cover shall have a safety tread or diamond surface design imprinted on one side.

CONSTRUCTION METHODS

The existing street lighting frame and cover shall be removed and discarded by the Contractor. The Contractor shall install the new frame and cover flush with the surrounding grade and shall allow adjustment of the frame and cover using a single course of brick, with a cement mortar mix used to close the opening between the frame and pullbox to prevent moisture or contaminants from entering the pullbox.

The cast iron pullbox frame and cover shall be grounded. This shall be accomplished by installing a split top bolt grounding connector suitable to accommodate one bare #4AWG stranded copper grounding wire in the drilled and tapped 3/8 X 16NC hole. The bare # 4AWG wire shall be connected to the ground lug on the ground rod and to the split top bolt in the pullbox frame.

The pullbox shall be left free and clear from dirt or any other foreign matter.

METHOD OF MEASUREMENT

Pullbox Frame and Cover (Roadway) Remove and Replace will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Pullbox Frame and Cover (Roadway) Remove and Replace shall be paid for at the contract

unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

ITEM 811.381	PULLBOX REMOVED AND RESET	EACH
ITEM 811.391	PULLBOX REMOVE AND TRANSPORT	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 801 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

CONSTRUCTION METHODS

All construction methods for resetting existing pullboxes shall conform to the specifications for Item 811.331 and Item 811.332.

Work under these items shall consist of removing, relocating, and resetting existing precast concrete pullboxes to a location designated by the Engineer. If directed by the Engineer, the Contractor shall deliver any pullbox that is removed and not reset to the Street Lighting Facility at 430A Canterbury Street, Roslindale, 02131. Special attention is directed to the fact that any existing poles and wires will be removed by the Contractor prior to any excavation unless otherwise specified. The excavation shall be large enough to permit the cutting of the conduit outside of the pullbox. After the pullbox has been removed, the conduit shall either be extended to a new pullbox location, capped if to be abandoned, or as directed by the Engineer.

METHOD OF MEASUREMENT

Pullbox Removed and Reset will be measured for payment by each unit installed, complete in place.

Pullbox Remove and Transport will be measured for payment by each unit removed and transported. The quantity of pullboxes including frames and covers removed and transported shall be the actual number removed and delivered to the City of Boston Street Lighting Facility at 430A Canterbury Street, Roslindale, 02131.

BASIS OF PAYMENT

Pullbox Removed and Reset will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for sawcutting and gravel backfill, but all costs in connection therewith shall be included in the Contract unit price bid.

Pullbox Remove and Transport will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for sawcutting, removing and transporting pullboxes, and gravel backfill, but all costs in connection therewith shall be included in the Contract unit price bid.

Cutting and capping existing conduits to be abandoned shall be considered as incidental to these items.

ITEM 812.092	LIGHT STANDARD BASE-PRECAST (MUNICIPAL STANDARD)	EACH
ITEM 812.0921	LIGHT STANDARD BASE-PRECAST TALL BASE (MUNICIPAL STANDARD)	EACH
ITEM 812.093	LIGHT STANDARD BASE-PRECAST SHORT BASE (MUNICIPAL STANDARD)	EACH
ITEM 812.094	LIGHT STANDARD BASE-PRECAST SHORT MODIFIED BASE (MUNICIPAL STANDARD)	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 801 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under these items shall consist of furnishing and installing various types and sizes of precast light standard bases at the locations shown on the plans or as directed by the Engineer, complete in place.

Light Standard Base - Precast (Municipal Standard) will be used at all locations as shown on the plans except where there are obstructions, then a Light Standard Base – Precast Short Base (Municipal Standard) shall be used. A Light Standard Base – Precast Short Modified Base (Municipal Standard) shall be used in conditions where obstructions would continue to impede the installation of a Light Standard Base – Precast Short Base (Municipal Standard). Short Bases and Short Modified Bases shall be installed only where permitted by the Engineer and in a manner as specified herein. Light Standard Base – Precast Tall Base (Municipal Standard) shall be installed instead to accommodate the additional loading resulting from the double arms, luminaires, banner and brackets, and flower hanging pots with brackets.

MATERIALS

The details of these precast light bases are included on the Boston Street Lighting Standards, Details U.6.1, U.6.2 and U.6.3. The complete specification (CSB-400) is on file at the City of Boston Street Lighting Division and is hereby made part of this specification.

CONSTRUCTION METHODS

All bases shall be installed at the location as shown on the plans or as approved to meet field conditions.

All bases will be set plumb and true to grade. All bases shall be installed to a depth of 6 inches below the finished grade, and under NO conditions may any portion of the securing hardware, i.e., threaded rods or nuts, protrude above the finished grade of the sidewalk area.

The Contractor shall carefully mark the proposed location of the concrete base and then they

shall determine if any utilities or underground or overhead obstructions will prevent the installation at this location. Similar markings shall be done for the conduit runs to the base. If such an obstruction is evident the Contractor shall request permission from the Engineer to move or adjust the location of the base.

Standard Base

If no obstruction is apparent at the proposed base location the Contractor shall make an opening not to exceed forty-two (42) inches by forty-two (42) inches by fifty-four (54) inches deep to be accomplished with hand digging. Mechanical excavating equipment may be used if approved by the Engineer and the excavation may exceed forty-two (42) inches by forty-two (42) inches by fifty-four (54) inches deep limits; however, if this means is used the Contractor must provide a six (6) inch cushion of gravel under the base and shall backfill using gravel well tamped in six (6) inch layers around the base. A compaction of 95% for a distance of five (5) feet around the base is required.

The backfill shall be thoroughly compacted by tamping with a pneumatic hammer equipped with a round dirt tamping pad with a minimum diameter of six (6) inches driven by an air compressor with a minimum of 100 psi pressure.

The use of an impactor attachment on a standard backhoe with a dirt tamping pad may substitute for the pneumatic hammer with the permission of the Engineer. Use of a vibrator type compactor around the precast base or pullbox is prohibited.

If the Contractor does not encounter any difficulty in the excavation and the soil conditions are suitable to support the base, the Contractor shall install the standard pre-cast concrete base furnished by the Contractor (dimensions of the base shall be indicated on the details provided on the Boston Street Lighting Standards). The top of the base must be level and installed as indicated on the plans.

Tall Base

The purpose of this light base is to accommodate the additional loading resulting from the double arms, luminaires, banner and brackets, and flower hanging pots with brackets. The base shall have steel reinforcement as shown on the standard detail.

Prior to excavation for the base, the Contractor should complete underground exploration to determine that the space is free from obstructions or utilities that may prevent the installation of the base.

If no obstruction is apparent at the proposed base location the Contractor shall make an opening not to exceed forty-two (42) inches by forty-two (42) inches by ninety (90) inches deep to be accomplished with hand digging. Mechanical excavating equipment may be used if approved by the Engineer and the excavation may exceed forty-two (42) inches by forty-two (42) inches by fifty-four (90) inches deep limits; however, if this means is used the

Contractor must provide a six (6) inch cushion of gravel under the base and shall backfill using gravel well tamped in six (6) inch layers around the base. A compaction of 95% for a distance of five (5) feet around the base is required.

The backfill shall be thoroughly compacted by tamping with a pneumatic hammer equipped with a round dirt tamping pad with a minimum diameter of six (6) inches driven by an air compressor with a minimum of 100 psi pressure.

The use of an impactor attachment on a standard backhoe with a dirt tamping pad may substitute for the pneumatic hammer with the permission of the Engineer. Use of a vibrator type compactor around the precast base or pullbox is prohibited.

If the Contractor does not encounter any difficulty in the excavation and the soil conditions are suitable to support the base, the Contractor shall install the tall pre-cast concrete base furnished by the Contractor (dimensions of the base shall be indicated on the details provided on the Boston Street Lighting Standards). The top of the base must be level and installed as indicated on the plans.

Short Base

If difficulty is encountered due to underground obstructions, ledge, rock, or when (in the opinion of the Engineer) the soil conditions require it, the Contractor shall install a short base as follows:

The short base will be constructed using pre-cast concrete (dimensions of the base shall be indicated on the details provided on the Boston Street Lighting Standards). The Contractor shall make an opening forty-two (42) inches by forty-two (42) inches by thirty-nine (39) inches deep. The Contractor shall then provide a cushion of six (6) inches of well compacted gravel under the base.

The short pre-cast concrete base is equipped with four 3/4 inch threaded inserts installed on all four (4) sides two and a half (2 1/2) inches from the bottom. The Contractor shall furnish and install four 3/4 inch threaded rods sixteen (16) inches long into the inserts. The rods shall be formed into an L by means of a 90 degree bend at the center of the rod. A bend other than 90 degrees to avoid an obstruction is permissible but total length of rod must be a minimum of sixteen (16) inches. After installing the threaded rods, the short pre-cast base shall be placed on the cushion of gravel and properly positioned and leveled as when using the standard pre-cast concrete base. The Contractor shall proceed to fill the entire excavation with a minimum of 0.5 cubic yards of Class B cement concrete well tamped and leveled with the top of the pre-cast base being sure that the 3/4 inch rods are well encased in the Class B cement concrete mixture. The slot for accepting the conduit shall be kept free from hardened cement or foreign matter. The Contractor is cautioned to use these bases only upon approval of the Engineer and further cautioned to provide the minimum of 0.5 cubic yards of Class B cement concrete as this base without the Class B cement concrete mixture will not properly support the street light post and luminaires.

Short Modified Base

If the Contractor encounters an underground obstruction that is extremely shallow and cannot be avoided by further adjustment of location, then the Contractor shall request the permission of the Engineer to make a special modification to the short base. The contractor is cautioned not to make any modification without the approval of the Engineer. The Contractor shall measure the depth of the obstruction from the surface. Said depth shall be marked on the short base at a level measured from the top of the bolts.

The bolts of the base are three (3) inches below the surface. The Contractor shall draw line around the base three (3) inches above the marked level to ensure proper installation. The modified short base shall then be scored by a concrete saw along the marked line and the concrete shall be broken away from the rods from the scored line to the bottom of the base. The rods of the modified short base shall be preserved intact but may be formed into a bend to pass the obstruction. The modified short base shall then be positioned and leveled as when using the standard base.

The Contractor shall proceed to fill the entire excavation with exactly one (1) cubic yard of Class B cement concrete well tamped and leveled with the top of the modified short base.

The Contractor shall make sure that the rods of the modified short base are well-encased in the Class B cement concrete mixture, and the slot for accepting the conduit shall be kept free from hardened cement and foreign matter. These modifications may only be performed by the Contractor with the approval of the Engineer. The Contractor must provide the specified one (1) cubic yard of Class B cement concrete since this modification of the short base is incapable of supporting the street light post and luminaire without this Class B cement concrete mixture.

The quantity of Class B cement concrete required for base stabilization will be as follows:

ITEM NO.	CUBIC YARDS OF CEMENT CONCRETE
812.092	0
812.0921	0
812.093	0.5
812.094	1

After the installation of the street light base and the repairing of the sidewalk, the Contractor shall cap the end of the exposed conduit. The recess in the sidewalk shall be closed with a twenty-one (21) inch by twenty-one (21) inch by 3/8-inch plywood cover (as shown on the Details). This cover shall be placed three (3) inches below and parallel to the finished sidewalk. Upon the cover, a hot-mix asphalt top course (2-5/8" in thickness after rolling or tamping), shall be laid.

On straight sections of curb, the bolts must be parallel with the face of the curb. On curved

sections, the bolts must be adjusted to allow proper placement of the bracket and luminaire on the pole into the roadway when installed. Placement of the base predetermines the placement of the bracket arm, as only a minor adjustment of the pole on the base can be accomplished when the post is installed.

METHOD OF MEASUREMENT

Light Standard Base-Precast (Municipal Standard), Light Standard Base-Precast Tall Base (Municipal Standard), Light Standard Base-Precast Short Base (Municipal Standard) and Light Standard Base-Precast Short Modified Base (Municipal Standard) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Light Standard Base-Precast (Municipal Standard) and Light Standard Base-Precast Tall Base (Municipal Standard) will be paid for at the respective Contract unit prices for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for excavation (except rock), furnishing and installing precast concrete bases, plywood and temporary HMA, but all costs in connection therewith shall be included in the Contract unit price bid.

Light Standard Base-Precast Short Base (Municipal Standard) and Light Standard Base-Precast short Modified Base (Municipal Standard) will be paid for at the respective Contract unit prices for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for excavation (except rock), furnishing and installing precast concrete bases, modification of pre-cast concrete bases, Class B cement concrete, anchor rods and bolts, plywood and temporary HMA, but all costs in connection therewith shall be included in the Contract unit price bid.

Gravel bed and backfill will be paid for under Item 151.02, Gravel.

ITEM 812.095 LIGHT STANDARD BASE REMOVED AND RESET EACH
ITEM 812.096 LIGHT STANDARD BASE REMOVE AND TRANSPORT EACH

GENERAL

Work under these items shall conform to the relevant portions of Section 800 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

CONSTRUCTION METHODS

All construction methods for resetting an existing light standard base shall conform to the specifications for Item 812.092.

Work under these items shall consist of removing, relocating, and resetting an existing precast concrete light standard base to a location designated by the Engineer. If directed by the Engineer, the Contractor shall deliver to the Street Lighting Facility at 430A Canterbury Street, Roslindale, 02131, any base that is removed and not reset. Special attention is directed to the fact that any existing poles and wires will be removed by the Contractor's forces prior to any excavation. The excavation to remove the light standard base shall be large enough to permit the cutting of the conduit before the sweep up the base. After the base has been removed, the conduit shall either be extended to a new base location, capped if to be abandoned, or as directed by the Engineer.

METHOD OF MEASUREMENT

Light Standard Base Removed and Reset will be measured for payment by each unit installed and accepted by the Engineer.

Light Standard Base Remove and Transport will be measured for payment by each unit removed and transported and accepted by the Engineer. The quantity of light standard bases removed and transported shall be the actual number removed and delivered to the City of Boston Street Lighting Facility at 430A Canterbury Street, Roslindale, 02131.

BASIS OF PAYMENT

Light Standard Base Removed and Reset will be paid for at the respective Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for sawcutting, conduit caps (if required) and gravel backfill, but all costs in connection therewith shall be included in the Contract unit price bid.

Light Standard Base Remove and Transport will be paid for at the respective Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for sawcutting, removing and transporting precast concrete bases, conduit caps (if required) and gravel

backfill, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 812.158	LIGHT STANDARD BASE-PRECAST (MUNICIPAL STANDARD) IN SOD AREA	EACH
ITEM 812.159	LIGHT STANDARD BASE-PRECAST SHORT BASE (MUNICIPAL STANDARD) IN SOD AREA	EACH
ITEM 812.160	LIGHT STANDARD BASE-PRECAST SHORT MODIFIED BASE (MUNICIPAL STANDARD) IN SOD AREA	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 801 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under these items shall consist of furnishing and installing various types and sizes of precast light bases in sod areas at the locations shown on the plans or as directed by the Engineer, complete in place. The term ”sod area” may refer to areas outside of sidewalk or hardscape surfaces including grass, bioswales, bioretention areas, or any other similar vegetated areas as noted on the plans or as designated by the Engineer.

Light Standard Base - Precast (Municipal Standard) In Sod Area will be used at all locations as shown on the plans except where there are obstructions, then a Light Standard Base – Precast Short Base (Municipal Standard) In Sod Area shall be used. A Light Standard Base – Precast Short Modified Base (Municipal Standard) In Sod Area shall be used in conditions where obstructions would continue to impede the installation of a Light Standard Base – Precast Short Base (Municipal Standard) In Sod Area. Short Bases and Short Modified Bases shall be installed only where permitted by the Engineer and in a manner as specified herein.

All applicable materials and construction methods for Items 812.092, 812.093, and 812.094 shall apply, but shall be amended as follows:

The quantity of Class B cement concrete required for base stabilization will be as follows:

ITEM NO.	CUBIC YARDS OF CEMENT CONCRETE
812.158	1
812.159	1.5
812.160	2

Excavation shall be increased to accommodate additional Class B concrete concrete.

When placing the Class B cement concrete, care shall be taken to avoid encasing utilities and tree roots.

METHOD OF MEASUREMENT

Light Standard Base-Precast (Municipal Standard) In Sod Area, Light Standard Base–Precast Short Base (Municipal Standard) In Sod Area and Light Standard Base–Precast Short Modified Base (Municipal Standard) In Sod Area will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Light Standard Base-Precast (Municipal Standard) In Sod Area, Light Standard Base–Precast Short Base (Municipal Standard) In Sod Area and Light Standard Base–Precast Short Modified Base (Municipal Standard) In Sod Area will be paid for at the respective Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for excavation (except rock), furnishing and installing precast concrete bases, Class B cement concrete, anchor rods and bolts, but all costs in connection therewith shall be included in the Contract unit price bid.

Gravel bed and backfill will be paid for under Item 151.02, Gravel.

ITEM 812.201 CONTROL CABINET BASE-PRECAST (MUNICIPAL STANDARD) EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 801 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

MATERIALS

The details of these precast concrete control cabinet bases are included on the Boston Street Lighting Standards, Detail U.7.1. The complete specifications (PBPCCRD-200, PBPCCSD-1400, CPCPB-100) are on file at the City of Boston Street Lighting Division and are hereby made a part of this specification.

CONSTRUCTION METHODS

Construction methods for installation of the control cabinet base shall conform to the relevant provisions of Items 811.331 and 811.332.

The control cabinet base shall be installed a minimum of 12 inches from the front face of the curb.

Two (2) standard ground rods and two (2) ground lugs shall be installed in the Control Cabinet base with a stretch of bare #4 AWG wire (42” in length) connected to both ground rods and left in the base to be connected to the proposed controller.

METHOD OF MEASUREMENT

Control Cabinet Base–Precast (Municipal Standard) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Control Cabinet Base–Precast (Municipal Standard) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for excavation (except rock), furnishing and installing control cabinet bases, ground rods, grounding lugs and grounding wire, but all costs in connection therewith shall be included in the Contract unit price bid.

Gravel backfill will be paid for under Item 151.02, Gravel.

ITEM 812.211 EVERSOURCE MANHOLE BREAK FOR LIGHTING CONTROLLER EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsections 801 and 813 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of coordinating all arrangements with an Eversource Company approved contractor to provide a manhole break in conjunction with the installation of a City of Boston Street Lighting Controller base.

The Contractor is required to engage one of the approved Eversource manhole break contractors (see attached list) who will make the necessary breaks into the manhole for the street lighting power supply. The Contractor shall directly pay the manhole break Contractor all fees and costs.

The finished roadway or sidewalk surface shall not be placed until the conduit has been installed and the manhole break is completed.

The Contractor shall install a 3/8" diameter polypropylene pull rope in the conduit between the controller and the manhole.

METHOD OF MEASUREMENT

Eversource Manhole Break for Lighting Controller will be measured for payment by each manhole break.

BASIS OF PAYMENT

Eversource Manhole Break for Lighting Controller will be paid for at the Contract unit price for each manhole break, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for any permit fees or other costs by Eversource, the Eversource approved manhole break contractor and all coordination, but all costs in connection therewith shall be included in the Contract unit price bid.

Conduit will be paid under Item 804.22, 2-Inch Electrical Conduit, Type NM, Plastic – (UL) (Municipal Standard); Item 804.33, 3-Inch Electrical Conduit, Type NM, Plastic – (UL) (Municipal Standard) and Item 804.333, 2-Inch or 3-Inch Electrical Conduit, Type NM, Plastic - (UL) (MS) In Same Trench

Conduit Construction Bidders List

Bond Brothers, Inc.
145 Spring Street
P.O. Box 26
Everett, MA 02149
Tom O'Connell - Tele: (617) 387-3400

Charles Contracting Co., Inc.
75 Rosedale Road
P.O. Box 216
Watertown, MA 02172
Chuck Frissora - Tele: (617) 923-0112

J. F. White Contracting Co.
P.O. Box 9020
10 Burr St.
Framingham, MA 01701-4617
Joe Lapointe Tele: (508) 879-4700

J.J. O'Brien & Sons
5 Fern St.
Waltham, MA 02454
Jerry O'Brien - Tele: 781-894-2145

Joseph Botti Co. Inc.
7 Turnpike Street
South Easton, MA 02375
Joe Botti - Tele: (508) 587-1878

McCabe Corp.
515 E. First Street
Boston, MA 02127
Andrew McCabe - Tele: (617) 268-2049

McCourt Construction Co.
60 K Street, 2nd Floor
South Boston, MA 02127

Murphy & Fahy Construction Co
Jack Murphy - Tele: (617) 269-2330
Fax: (617) 269-2313
P.O. Box 453 Milton, MA 02186
Ned Murphy - Tele: (781) 828-8899

N.E. Utility Constructors, Inc. 143 Spring St.
P.O. Box 698 Everett, MA 02149
Dave Newsham - Tele: (617) 389-5500

R.J. Devereaux Corp.
10 Emerson Place Suite 2E
Boston, MA 02114
Paul Kelly - Tele: (617) 742-3830

Riley Bros. Inc.
28 N. Bowditch St.
Braintree, MA 02184
Suite #1
Tim Riley - Tele: (617) 786-1515

UCSC
P.O. Box 191 Suite #1
10 Thorndike Street
Everett, MA 02149
Steve Fuller - Tele: (617) 387-2965

SECTION C

CABLE INSTALLATION

ITEM 813.40	WIRE TYPE 8 NO. 10 DIRECT BURIAL	LINEAR FOOT
ITEM 813.431	WIRE TYPE 8 NO. 4 DIRECT BURIAL	LINEAR FOOT

GENERAL

The Contractor shall be required to furnish and install all materials, equipment, and labor necessary to completely wire and operate the street lighting system.

All materials and wiring procedures shall conform to the relevant portions of Subsection 813 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

All wire and connectors shall conform to the most current standards of the National Electrical Manufacturers Association or the Underwriters' Laboratories, Inc., whichever is applicable.

All materials and workmanship shall conform to the most current requirements of the National Electrical Code, Standards of the American Society for Testing and Materials, USA Standards, and any local ordinances which may apply.

Wire sizes shall be based on American Wire Gage (AWG), as applied to copper conductors.

MATERIALS

The details of the cable and connectors are included on the Boston Street Lighting Standards, Details U.8.1, U.8.2, U.8.3 and U.9. The complete specification (SLC-200, SLCPB-400) is on file at the City of Boston Street Lighting Division, and is hereby made part of this specification.

The conductor shall be composed of soft drawn 7-strand copper of the gauge shown and the insulation shall be installed as a single jacket of cross-linked polyethylene of Underwriter's Laboratories Type USE or RHH-RHW rated at 90 degrees C continuous in dry locations and 75 degrees C continuous in wet locations, 600 volt as per the National Electrical Code.

Wire and cable furnished and used shall be new and shall have the size, grade of insulation, voltage and manufacturer's name permanently marked on the outer covering at regular intervals. Wire and cable shall be delivered to the site in complete coils or reels with identifying size, type, and insulation tags. Wire and cable shall be protected from weather and damage during storage and handling.

Connectors, Fuses, and Splicing Materials

The street light connectors described in the following specifications and sketches show details of a connector which is felt will be suitable for a range of conductors.

CONSTRUCTION METHODS

No wire shall be drawn in to any conduit until all work which may cause cable damage is complete.

All wire shall be continuous from handhole to handhole without running splices in conduits. A splice will be required for each circuit wire at each and every pullbox. All wires shall extend 24" above the pullbox, connected at ends and rolled back into the pullbox.

All wire terminals, taps, and splices shall be made secure with connectors, splicing materials and methods as hereinafter specified.

All splices in pullboxes shall be with solderless connectors. The neutral and ground connection in the post top shall be with an insulated pressure connector. The hot line connection in the post top shall be with an approved street light fuse connector.

All incoming wires and outgoing wires in street lighting control boxes, pullboxes and poles shall be banded with 1/2-inch colored plastic marking tape installed at two locations 6 inches from the taped splice and 28 inches from the taped splice.

The Color Code is as follows:

Single Red Band-Hot lead for street lights
Single Blue Band-Hot lead for street lights
Double Red Band-connected to power source feed wires
Double Blue Band-connected to power source feed wires
Single Yellow Band-Hot lead for 2nd street light circuit
Single Orange Band-Hot lead for 2nd street light circuit
Single Green Band-Bonding lead (continuous grounding lead)
Single White Band-Neutral for street lights circuit
Double White Band-Neutral for 2nd street light circuit
Triple White Band-Neutral for power source feed wires

Double and triple bands of marking tape shall be installed 1/2 inch apart.

Three Wire, Circuit No. 1

1 Hot Lead - Single Red Band 1 Hot Lead - Single Blue Band Neutral wire - Single White Band

Three Wire, Circuit No. 2

1 Hot Lead - Single Orange Band 1 Hot Lead - Single Yellow Band Neutral wire - Double White Band

Grounding

Coatings and rust on conduits and grounding rods shall be removed at the location where the ground fittings are to be installed.

The bare copper conductor shall be connected to the continuous insulated bonding lead which shall be identified with green plastic marking tape as noted in the specifications.

Bonding leads for lighting fixtures on posts shall be an insulated #10 AWG, marked green, which shall be extended to the nearest pullbox and interconnected to the #4 AWG bare copper and the #4 AWG pig tail conductor shall be connected to the ground rod. The bare #4 ground wire shall be connected to the ground lug on the pullbox frame.

A #4 AWG conductor with the same insulation of the power leads shall be installed in all conduits as a continuous bond wire. All bonding leads from fixtures, post, control boxes, fittings and ground rods shall be connected to the continuous insulated bonding lead which shall be identified with green plastic marking tape as noted in the specifications.

All grounding shall conform to the applicable provisions of the National Electrical Code.

Field Tests

Upon the completion of each wiring system, and before any connection is made to operating equipment, the Contractor shall perform, in the presence of the Engineer and a representative from the City's Street Lighting Division, the following tests of each circuit to determine whether the installations are in acceptable working order.

a. Tests for continuity
b. Tests for ground
c. Tests for insulation resistance (Megger Test) from circuit wires to ground, and between circuit wires.
d. Functional test

The reference point for ground tests shall be the nearest hydrant. When testing for ground at a control box two ground tests shall be performed. One using the ground rod at the control box and one using the nearest hydrant as ground with the local ground rod disconnected. If in the judgment of the Engineer or the City's representative, the resistance to ground using the local ground rod is appreciably higher than that using the hydrant, the Contractor shall drive additional ground rods until a sufficiently low resistance to ground at the local ground rod or rods is obtained. Twenty-five ohms ground shall be the maximum permissible.

With all equipment connected to the wiring system, a functional test shall be performed by the Contractor, in the presence of the Engineer or the City’s representative, to demonstrate that the system as a whole, and all parts thereof, function as specified or intended herein.

Any defective materials or faulty or improper installation shall be permanently corrected by repairs or replacements to be made by the Contractor to the satisfaction of the Engineer and

the City's Street Lighting Division representative at no additional cost to the City.

The functional test for the entire lighting system installed in this contract shall be in accordance with the warranty as noted below. A nighttime lighting period shall consist of ten (10) hours of use. Lighting units indicate each individual luminaires.

The entire electrical wiring system shall be tested for continuity, grounds, resistance to ground, insulation, shorts and opens. This shall be done by means of a megohm meter test.

After installation of the wiring system complete with the required splices, the lamp ballast primary shall be disconnected and each circuit shall be tested with a 1000 volt megger.

Tests on each circuit shall be between each phase conductor and the uninsulated conductor, where employed, or between two insulated conductors where required. When the conductor and an uninsulated conductor or less than 200 megohms between two insulated conductors, the Contractor shall locate the point or points at fault and make proper corrections and then demonstrate by further test the elimination of such faults.

These tests shall be performed in the presence of the Engineer.

The test results shall be submitted to the Engineer for further review and approval. If any results are questionable or inconsistent, the Contractor shall repeat the tests and make any necessary corrections at the request of the Engineer. No wiring system will be accepted until these are satisfactorily performed and approved.

The Contractor shall furnish the Engineer with a report of the megohm-meter readings for a permanent project record.

All tests and any necessary repairs or replacements which are indicated by them to produce a fault-free system will be performed at the Contractor's expense.

Warranties of City Street Lighting System

The City Street Lighting shall be completed two months prior to the contract completion date. The lighting system shall then be put in operation for the specified two-month period during which time fine tuning and adjustments are to be made at no additional cost to the City.

The Contractor shall provide a performance warranty for six months on the entire work performed under this contract including the performance of all equipment and components of the highway lighting system specified. The performance warranty responsibility of the Contractor shall commence after official acceptance by the Boston PWD, Street Lighting Division.

NOTE: The Contractor shall be fully responsible for all maintenance, repairs, and replacement of equipment damaged during the functional test and throughout the performance warranty period, provided such damage results from the Contractor’s

operations, negligence, or failure to comply with the standards/requirements.

If within 48 hours after notification by the Engineer of a malfunction, and the Contractor fails to make such repairs as necessary, the Engineer will undertake repairs of which all costs are to be borne by the Contractor.

Shutdown caused by factors beyond the Contractor's control shall not constitute discontinuity of the functional test.

METHOD OF MEASUREMENT

Wire Type 8 No. 10 Direct Burial and Wire Type 8 No. 4 Direct Burial will be measured for payment by the linear foot, complete in place.

BASIS OF PAYMENT

Wire Type 8 No. 10 Direct Burial and Wire Type 8 No. 4 Direct Burial will be paid for at the Contract unit price per linear foot, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for furnishing, installing, and connecting the street lighting cables, the grounding of the system and testing the lighting circuit wiring, but all costs in connection therewith shall be included in the Contract unit price bid.

The cost of any repair and maintenance necessary during the warranty period (except electrical energy) shall be incidental to the cost of the Contract item.

ITEM 813.65 STREET LIGHTING NONCONDUCTIVE INSULATING SLEEVE (MS) EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsections 801 and 813 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of furnishing and installing street lighting nonconductive insulating sleeves in pullboxes, and at the locations as shown on the plans or as directed by the Engineer.

MATERIALS AND FABRICATION

The details of the street lighting nonconductive insulating sleeves are included on the Boston Street Lighting Standards, Detail U.12.

All materials and construction procedures shall conform to the specifications contained herein, Specification PISLP-100 and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The unit shall be equipped with a 5-3/4" wide by 9-1/4" long metallic tag that is secured to the sleeve top that has the following legend in ½" high letters:

CAUTION ELECTRICAL CABLES BELOW
REMOVAL BY AUTHORIZED CITY OF BOSTON PERSONNEL ONLY
VIOLATORS SUBJECT TO A $ 1,000.00 FINE

INSTALLATION

The Contractor shall exercise special care in installing street lighting nonconductive, insulating sleeves so that they are firmly installed in the pullboxes after all cable and splicing has been completed and before the pullbox cover has been permanently secured and in accordance with the Details shown on the Boston Street Lighting Standards and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The street lighting nonconductive, insulating sleeves shall not be installed until the related control cabinet and related underground wiring have been completed and tested.

METHOD OF MEASUREMENT

Street Lighting Nonconductive Insulating Sleeve (MS) will be measured for payment per each unit installed, complete in place.

BASIS OF PAYMENT

Street Lighting Nonconductive Insulating Sleeve (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work.

SECTION D

POSTS AND LUMINAIRES

ITEM 821.842 POST – HANCOCK GAS LAMP, 9'-5" POST HEIGHT (MS) EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of furnishing and installing fluted cast iron gas lamp posts at the locations as shown on the plans or as directed by the Engineer.

MATERIALS and FABRICATION

The details of the fluted cast iron gas posts are included on the Boston Street Lighting Standards, Detail L.6.1.

All materials and construction procedures shall conform to the specifications contained herein, Specification CIGLP-300, CIFS-200, and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The post shall consist of a base section and tapered column, and each part shall be a one-piece section as indicated on the Details. The complete post shall be constructed of all new material and shall consist of heavy-wall cast iron as per ASTM A48-83 Class 30 Cast Iron.

The base section of the post assembly shall be complete with a base plate with (4) four 1-3/8 inch diameter drilled holes to accept 1 inch diameter steel bolts on a 17 inch bolt circle.

The column shall be a tapered design and the upper portion of the column shall have a tenon. The complete post shall conform to and meet all current requirements of the American Standards Association and the American Society for Testing Materials as each shall apply, and in addition the following standards shall apply:

ASTM A48 – Class 30 for Grey Cast Iron

All components of the Post – Hancock Gas Lamp shall receive two shop coats of an approved metal primer of a light color. Two finish coats of a high-gloss black enamel paint of a type approved for outdoor use on metal shall be applied to all components after installation.

Each post shall be equipped with 2 #11 and 2 #16 gauge metal shims to allow adjustment of the post on the base.

TESTING

The Contractor shall be responsible for submitting all test data required under these items and as called for in the specifications to the Boston PWD, Street Lighting Division. Under no conditions shall a final acceptance of any lighting system be authorized until all required

engineering test data has been submitted.

The post shall meet the minimum EEI-NEMA Standards for Street Lighting Posts under paragraph 3.2 Pole Strength and Deflection of sustaining a horizontal test load of 500 pounds applied 18 inches from the top of the shaft in any direction without failure of any component part with a deflection of not more than 7 1/2% of the pole shaft length plus an allowance of 1/2 inch for testing methods and permanent set. Deflection is defined as the distance between the centerline of a post at the point of application and the location of the centerline of the post while sustaining the test load.

This test is a mandatory provision of these specifications and contract documents, and certified engineering data with regard to the result of these tests must be furnished before the first shipment of posts. This test must be duplicated at the 25%, 50%, and 100% time of delivery. Failure of the Manufacturer to perform these tests to ensure compliance may leave the Manufacturer liable for defective posts.

INSTALLATION

The Contractor shall exercise special care in erecting cast iron light posts to ensure that they are firmly secured to the concrete base and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The post is to be erected in sections: the cast iron base section, the fluted cast iron shaft and the luminaire. The shims furnished with the post shall be used if necessary. The street lighting post shall be erected so that the luminaire is parallel to the curb line of the street. The street lighting post shall not be installed until the related control cabinet and related underground wiring have been completed and tested.

Installation shall include the placement of oakum and lead fill between the upper shaft and lower base section. Before leading, all base sections and shafts shall be set level and plumb. Posts cannot be adjusted after the leading procedure has been completed.

When installing a cast iron post, the following procedure for bonding shall be used. A single hole shall be drilled in the neck area of the cast iron shaft capable of holding a 10/32 inch machine bolt and bonding lug. The bonding lug shall be attached to the inside of the neck and the incoming green bond shall be secured to the bonding lug.

Post wiring and connections shall be installed as per Item 813.40, Wire Type 8 No. 10 Direct Burial.

METHOD OF MEASUREMENT

Post – Hancock Gas Lamp, 9’-5” Post Height (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Post – Hancock Gas Lamp, 9’-5” Post Height (MS) will be paid for at the Contract unit price bid for each unit, which price shall include all labor, materials, equipment and incidental costs to complete the work. No separate payment will be made for post wiring and connections, installation of oakum and leading of post, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 821.852	POST – NEIGHBORHOOD STEEL, 11'-4" POST HEIGHT (MS)	EACH
ITEM 821.853	POST – NEIGHBORHOOD STEEL, 13'-4" POST HEIGHT (MS)	EACH
ITEM 821.854	POST – NEIGHBORHOOD STEEL, 16'-4" POST HEIGHT (MS)	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division. All materials and construction procedures shall conform to the specifications contained herein, Specification BNCPSTP 100.

Work under these items shall consist of furnishing and installing fluted steel posts (Boston Neighborhood Style) at the locations as shown on the plans or as directed by the Engineer.

MATERIALS and FABRICATION

The details of these fluted steel posts are included on the Boston Street Lighting Standards, Details L.1.2.1, L.1.2.2, L.1.2.3, L.1.2.4 and L.1.3.

The post shall be constructed of all new material and shall consist of a steel post fabricated from 7 gauge monotube construction with 12 flat flutes to resemble a Cast Iron Boston Neighborhood Style Post and a one (1) piece slipover base section constructed of heavy wall cast iron as per ASTM A48 Class 30 Cast Iron.

The post shall have a base plate welded to it. Four (4) - 1-1/4" x 2" slotted holes shall be drilled as shown on the Details to accommodate four (4) - 1" anchor bolts. A continuous weld in two places shall be applied to the post and the base plate as shown on the Details.
Gussets shall be welded to the post and shaft in four places as shown on the Details to provide additional stability to the post.

The post shall have a tenon to accommodate single post top type luminaires (with slipover adapter) or various bracket arms for multiple luminaires.

The casting for the base section shall be true to the Details.

They shall have close tolerances to assure a tight fit and appearance to resemble the cast iron post. They shall have a dense, smooth surface, uniform quality of appearance that is free from blow holes or runoffs, porous spots, hard spots and shrinkage faults or cracks. The castings shall be thoroughly and carefully cleaned of all sand, scale, and fins. They shall be free from marks of core anchor projections and imperfections. All ornamental details and markings shall be sharp and clearly defined.

It is imperative that all bearing surfaces and O.D. faces of the shaft and post have close tolerances to assure a proper fit and appearance of the completed post assembly. It is also imperative that the base plate be machined true to the bottom surfaces to allow proper and level attachment to a pre-cast base. The cast iron tenon adapter and ring assembly (to be used with single luminaires) shall consist of one-piece heavy wall cast iron as per ASTM A48 Class 30 manufactured to the dimensions as called for on the Details.

A rectangular boss shall be fabricated in the steel post with a fluted steel cover for mounting and optional receptacle with weatherproof cover.

The boss and fluted steel cover shall be fabricated to the dimensions as shown on the Details.

All castings shall be thoroughly and carefully cleaned of all sand, scale, and fins. They shall be free from marks of core anchors, projections, and imperfections.

All ornamentation details and markings shall be sharp and clearly defined. Flutes (12 flat flutes) shall be sharp and straight. All castings shall be carefully machined as called for on the Details.

Provisions must be made on each component casting as shown on the Details to provide the letter 'B' recessed one inch high. Legend should, if possible, be incorporated into the patterns for the castings.

The complete post shall conform to and meet all current requirements of the American Standards Association and the American Society for Testing Materials as each shall apply; and in addition the following standard shall apply:

ASTM A48 - Class 30 for Grey Cast Iron

All components of the fluted steel post shall receive one (1) shop coat of an approved metal primer of a light color. Two (2) finish coats of a high gloss black enamel paint of a type approved for outdoor use on metal shall be applied to all components after installation.

Each post shall be equipped with 2 #11 and 2 #16 gauge metal shims to allow adjustment of the post on the base.

TESTING

The Contractor shall be responsible for submitting all test data required under these items and as called for in the specifications to the Boston PWD, Street Lighting Division. Under no conditions shall a final acceptance of any lighting system be authorized until all required engineering test data has been submitted.

The post shall meet the minimum EEI-NEMA Standards for Street Lighting Posts under paragraph 3.2 Pole Strength and Deflection of sustaining a horizontal test load of 500 pounds

applied 18 inches from the top of the shaft in any direction without failure of any component part with a deflection of not more than 7 1/2% of the pole shaft length plus an allowance of 1/2 inch for testing methods and permanent set. Deflection is defined as the distance between the centerline of a post at the point of application and the location of the centerline of the post while sustaining the test load.

This test is a mandatory provision of these specifications and contract documents, and certified engineering data with regard to the result of these tests must be furnished before the first shipment of posts. This test must be duplicated at the 25%, 50%, and 100% time of delivery. Failure of the Manufacturer to perform these tests to ensure compliance may leave the Manufacturer liable for defective posts.

INSTALLATION

The Contractor shall exercise special care in erecting fluted steel light posts to ensure that they are firmly secured to the concrete base and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The post is to be erected in sections: the fluted steel post, the cast iron base section, the bracket arm (if specified), the slipover adapter assembly (single luminaire), and the luminaire(s). The shims furnished with the post shall be used if necessary. The street lighting post shall be erected so that the bracket arm of the luminaire (where applicable) is parallel to the curb line of the street. The street lighting post shall not be installed until the related control cabinet and related underground wiring have been completed and tested.

When installing a fluted steel post, the following procedure for bonding shall be used. A 1/4 - twenty tapped hole with a split top bolt grounding connector shall be installed in the post top tenon. The bonding lug shall be attached to the inside of the neck and the incoming green bond shall be secured to it. All bonding leads from the luminaire(s) and bracket arms (when specified) shall be crimped together, and a single green lead shall be secured to the bonding lug.

If a weatherproof receptacle on the fluted steel post is specified, the following installation method shall be used. All post wiring shall terminate at the post top. Three (3) #10 AWG RHH-RhW-USE cables shall be installed from the post top to the weatherproof receptacle. Luminaire and receptacle shall be individually fused. Luminaires shall be fused as specified. The receptacle shall be fused for 10 amps. No wire nuts shall be allowed. The weatherproof receptacle shall be a 2 pole, three wire, 15 amp, 125 volt single receptacle with a vertical lift, weatherproof cover.

Post wiring and connections shall be installed as per Item 813.40, Wire Type 8 No. 10 Direct Burial.

METHOD OF MEASUREMENT

Post – Neighborhood Steel, 11’-4” Post Height (MS), Post – Neighborhood Steel, 13’-4” Post Height (MS) and Post – Neighborhood Steel, 16’-4” Post Height (MS) will be measured for

payment by each unit installed, complete in place.

BASIS OF PAYMENT

Post – Neighborhood Steel, 11’-4” Post Height (MS), Post – Neighborhood Steel, 13’-4” Post Height (MS) and Post – Neighborhood Steel, 16’-4” Post Height (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for post wiring and connections, receptacle, and weatherproof cover (if specified), but all costs in connection therewith shall be included in the Contract unit price bid.

Bracket Arms (if specified) and Luminaires shall be paid for under the appropriate items.

ITEM 821.866	POST – BOULEVARD STEEL, 20’-10” POST HEIGHT (MS)	EACH
ITEM 821.867	POST – BOULEVARD STEEL, 24'-10" POST HEIGHT (MS)	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under these items shall consist of furnishing and installing fluted steel posts (Boston Boulevard Style) at the locations as shown on the plans or as directed by the Engineer.

MATERIALS AND FABRICATION

The details of these fluted steel posts are included on the Boston Street Lighting Standards, Details L.2.2.1, L.2.2.2, L.2.2.3, L.2.2.4, L.2.2.5 and L.2.3.

All materials and construction procedures shall conform to the specifications contained herein, Specification PBBSTP-100, and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The post shall be constructed of all new material and shall consist of a steel post fabricated from 7 gauge monotube construction with 12 flat flutes to resemble a Cast Iron Boston Boulevard Style Post and a one (1) piece slipover base section constructed of heavy wall cast iron as per ASTM A48 Class 30 Cast Iron.

A rectangular boss shall be fabricated in the steel post with a fluted steel cover for mounting an optional receptacle with weatherproof cover. The boss and fluted steel cover shall be fabricated to the dimensions as shown on the Details.

The complete post shall conform to and meet all current requirements of the American Standards Association and the American Society for Testing Materials as each shall apply; and in addition, the following standard shall apply:

ASTM A48 - Class 30 for Grey Cast Iron

All components of the fluted steel post shall receive one (1) shop coat of an approved metal primer of a light color. Two (2) finish coats of a high gloss black enamel paint of a type approved for outdoor use on metal shall be applied to all components after installation.

Each post shall be equipped with 2 #11 and 2 #16 gauge metal shims to allow adjustment of the post on the base.

Any and all supplemental holes for auxiliary equipment shall be made at the factory and shall

be drilled, tapped and plugged prior to shipment. The contractor shall remove the plug when required to install auxiliary equipment. The Contractor shall install a rubber grommet in the pole to properly prevent abnormal wear and tear to the wires in the pole.

TESTING

The Contractor shall be responsible for submitting all test data required under these items and as called for in the specifications to the Boston PWD, Street Lighting Division. Under no conditions shall a final acceptance of any lighting system be authorized until all required engineering test data has been submitted.

The post shall meet the minimum EEI-NEMA Standards for Street Lighting Posts under paragraph 3.2 Pole Strength and Deflection of sustaining a horizontal test load of 500 pounds applied 18 inches from the top of the shaft in any direction without failure of any component part with a deflection of not more than 7 1/2% of the pole shaft length plus an allowance of 1/2 inch for testing methods and permanent set. Deflection is defined as the distance between the centerline of a post at the point of application and the location of the centerline of the post while sustaining the test load.

This test is a mandatory provision of these specifications and contract documents, and certified engineering data with regard to the result of these tests must be furnished before the first shipment of posts. This test must be duplicated at the 25%, 50%, and 100% time of delivery. Failure of the Manufacturer to perform these tests to ensure compliance may leave the Manufacturer liable for defective posts.

INSTALLATION

The Contractor shall exercise special care in erecting fluted steel light posts to ensure that they are firmly secured to the concrete base and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The post is to be erected in sections: the fluted steel post, the cast iron base section, the bracket arm(s) (as specified), and the luminaire(s). The shims furnished with the post shall be used if necessary. The street lighting post shall be erected so that the bracket arm of the luminaire is perpendicular to the curb line of the street. The street light post shall not be installed until the related control cabinet and underground wiring have been completed and tested.

When installing a fluted steel post, the following procedure for bonding shall be used. A ¼ - twenty tapped hole with a split top bolt grounding connector shall be installed in the post top tenon. The bonding lug shall be attached to the inside of the neck, and the incoming green bond shall be secured to it. All bonding leads from the luminaire(s) and bracket arms (when specified) shall be crimped together, and a single green lead shall be secured to the bonding lug.

If a weatherproof receptacle on the fluted steel post is specified, the following installation method shall be used. All post wiring shall terminate at the post top. Three (3) #10 AWG

RHH-RHW-USE cables shall be installed from the post top to the weatherproof receptacle. Luminaire and receptacle shall be individually fused. Luminaires shall be fused as specified. The receptacle shall be fused for 10 amps. NO wire nuts shall be allowed. The weatherproof receptacle shall be a 2 pole, three wire, 15 amp, 125 volt single receptacle with a vertical lift, weatherproof cover.

Post wiring and connections shall be installed as per Item 813.40, Wire Type 8 No. 10 Direct Burial.

METHOD OF MEASUREMENT

Post – Boulevard Steel, 20'-10" Post Height (MS) and Post – Boulevard Steel, 24'-10" Post Height (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Post – Boulevard Steel, 20'-10" Post Height (MS) and Post – Boulevard Steel, 24'-10" Post Height (MS) will be paid for at the respective Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for post wiring and connections, receptacle, supplementary holes for auxiliary equipment, rubber grommet and weatherproof cover (if specified), but all costs in connection therewith shall be included in the Contract unit price bid.

Payment for flower hanging bracket arms and arms for mounting a 3'x 5' banner (if required) shall be considered incidental to this item.

Bracket Arms (as specified) and Luminaires (as specified) shall be paid for under the appropriate items.

ITEM 821.872 POST – FORT POINT STEEL, 13'-4" POST HEIGHT (MS) EACH

GENERAL

Work under this item shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The work under this item shall consist of furnishing and installation of fluted steel posts at the locations as shown on the plans or as directed by the Engineer.

MATERIALS and FABRICATION

The details of the fluted steel posts are included on the Boston Street Lighting Standards, Detail L.4.2.1.

All materials and construction procedures shall conform to the specifications contained herein, specification BFPSTP-100, and the requirements and standard practices of the Boston PWD, Street Lighting Division.

The post shall be constructed of all new material and shall consist of a steel post fabricated from 7 gauge monotube construction and a one (1) piece slipover octagonal base section constructed of heavy wall cast iron as per ASTM spec. A48-83 Class 30 Cast Iron.

The post shall have a base plate welded to it. Four (4) 1-1/4” x 2” slotted holes shall be drilled as shown on the Details to accommodate four (4) 1” anchor bolts. A continuous weld in two places shall be applied to the post and the base plate as shown on the Details. Gussets shall be welded to the post and shaft in four places as shown on the drawings to provide additional stability to the post.

For double installations, the post shall have a tenon to accept bracket arm as shown on the Details. Bracket arm shall be from L of luminaire to L as shown on the Details.

The casting for the base section shall be true to Details. It shall have a close tolerances to assure a tight fit and appearance to resemble a cast iron post. It shall have a dense, smooth surface, uniform quality of appearance, free from blow holes or runoffs, porous spots, hard spots and shrinkage faults or cracks. The castings shall be thoroughly and carefully cleaned of all sand, scale, and fins. They shall be free from marks or core anchor projections and imperfections. All ornamental details and markings shall be sharp and clearly defined.

It is imperative that all bearing surfaces and O.D. faces of the shaft and post have close tolerances to assure a proper fit and appearance of the completed post assembly. It is also imperative that the base plate be machined true to the bottom surfaces to allow for proper and level attachment to a pre-cast subbase.

The cast iron base section shall have provisions for the installation of a plaque. The plaque shall be recessed in the cast iron base section. The center of the recess shall have a slip hole drilled to accept a bolt to secure the plaque to the base section. If a plaque is not intended to be installed, the hole shall be plugged using a removable metallic plug.

A rectangular boss shall be fabricated in the steel post with a fluted steel cover for mounting GFI receptacle with a weatherproof cover. The boss and fluted steel cover shall be fabricated to the dimensions as shown on the Details.

All castings shall be thoroughly and carefully cleaned of all sand, scale, and fins. The casting shall be free from marks, core anchors, projections and imperfections.

All ornamentation details and markings shall be sharp and clearly defined. All castings shall be carefully machined as called for on the Details.

Provisions must be made on each component casting as shown on the Details to provide the letter ‘B’ recessed one inch high. Legend should, if possible, be incorporated into the patterns for the castings.

The complete post shall conform to and meet all current requirements of the American Standard Association and American Society of Testing Materials as each shall apply; and in addition to the following standard shall apply:

ASTM A48 - Class 30 for Grey Cast Iron

All components of fluted steel post shall receive one (1) shop coat of an approved metal primer of a light color. Two (2) furnish coats of high gloss black enamel paint of a type approved for outdoor use on metal shall be applied to all components after the installation.

Each post shall be equipped with 2 #11 and 2 #16 gauge metal shims to allow adjustment of the post on the subbase.

TESTING

The Contractor shall be responsible for submitting all test data required under these items to the Boston PWD, Street Lighting Division as called for in the specifications. Under no conditions shall a final acceptance of any lighting system shall be authorized until all required engineering test data has been submitted.

The post shall meet a minimum EEI-NEMA Standards for Street Lighting Posts under paragraph 3.2 Pole Strength and Deflection of sustaining a horizontal test load of 500 pounds applied 18 inches from the top of the shaft in any direction without failure of any component part with a deflection of not more than 7-1/2 % of the pole shaft length plus an allowance of 1/2 inch for testing methods and permanent set. Deflection is defined as the

distance between the centerline of a post as the point of application and the location of the centerline of the pole while sustaining the test load.

This test is a mandatory provision of the specifications and contract documents; and certified engineering data with regard to the result of these tests must be furnished before the first shipment of the posts. This test must be duplicated as the 25%, 50%, and at the 100% time of delivery. Failure of the Manufacturer to perform these tests to insure compliance may leave the Manufacturer liable for defective posts.

INSTALLATION

The Contractor shall exercise special care in erecting fluted steel light posts to ensure that they are firmly secured to the concrete base and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The post is erected in sections: the fluted steel post, the cast iron base section, the bracket arm (if applicable), and the luminaires. The shims furnished with the posts shall be used if necessary. The street light post shall not be installed until the related control cabinet and related underground wiring have been completed and tested.

When installing a fluted steel post, the following procedure for bonding shall be used. A 1/4 - twenty tapped pole hole with a split top bolt grounding connector shall be installed in the post top tenon. The bonding lug shall be attached to the inside of the neck and the incoming green bond shall be secured to it. All bonding leads from the luminaires and bracket arms shall be crimped together and a single green lead shall be secured to the bonding lug.

Post wiring and connections shall be installed as per Item 813.40, Wire Type 8 No. 10 Direct Burial.

METHOD OF MEASUREMENT

Post – Fort Point Steel, 13’-4” Post Height (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Post – Fort Point Steel, 13’-4” Post Height (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for post wiring and connections and receptacle, but all costs in connection therewith shall be included in the Contract unit price bid.

Bracket arms (if specified) and Luminaires shall be paid for under the appropriate items.

ITEM 821.882	POST – HEXAGONAL CONCRETE, 14'-0" POST HEIGHT (MS)	EACH
ITEM 821.883	POST – HEXAGONAL CONCRETE, 19'-0" POST HEIGHT (MS)	EACH
ITEM 821.884	POST – HEXAGONAL CONCRETE, 24'-0" POST HEIGHT (MS)	EACH
ITEM 821.885	POST – HEXAGONAL CONCRETE, 29'-0" POST HEIGHT (MS)	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division. All materials and construction procedures shall conform to the specifications contained herein, Specification CCPT-400.

Work under these items shall consist of furnishing and installing hexagonal concrete posts at the locations as shown on the plans or as directed by the Engineer.

MATERIALS and FABRICATION

The details of these fluted steel posts are included on the Boston Street Lighting Standards, Details L.3.2.1, L.3.2.2, L.3.2.3, L.3.2.4, L.3.2.5, L.3.2.6 and L.3.2.7

The post shall be pre-stressed concrete posts, machine made by centrifugal process with exposed aggregate produced by a water polished finish. The exposed aggregate finish shall be produced by aggregate from 3/8" to #100 sieve. Aggregate shall be free from foreign matter to the extent of 95% of the total weight of the aggregate. The percentage of wear shall not exceed 35% at 500 revolutions when tested in accordance with ASTM designation C131. The cement used shall be high early strength of 8000 pounds per square inch minimum under steam curing before pre-stressed reinforcing is released. The concrete shall be air entrained to prevent surface scaling and internal damage caused by the freeze thaw process and the use of road de-icers during winter months. The percentage of air entrainment add mixture shall be used to produce a 6% plus or minus 1% air content in the mix. The reinforcement steel shall have an ultimate strength of at least 250,000 pounds per square inch and shall be pre-stressed. Spacer rings with non-ferrous studs shall be securely attached to the reinforcement to ensure a minimum coverage of 1/2 inch of concrete. Where minimum coverage cannot be maintained near a required opening such as a handhole door opening or other opening, the reinforcing shall be protected by means of a non-corrosive sleeve. Spiral wrapping of the diameter of not less than 0.105 inches shall be spaced on a 3 inch pitch for the full length of the post for additional strength to the post, and shall be securely tied to the reinforcing. Additional reinforcing shall be provided for the top 24 inches of the post to prevent damage from whiplash where the post is struck a glancing blow by a motor

vehicle. Any additional reinforcing that the Manufacturer shall deem necessary to provide a sturdy post for street lighting use shall be completely encased in concrete and shall be provided for as necessary.

Posts shall be of pre-stressed concrete of the design and dimensions shown and shall be constructed to have the maximum density, smooth finish without blemish, proper embedment of the reinforcing and provide that flexural cracking shall not occur during handling and installation or under designated loads. Posts must contain a raceway for cable formed by the centrifugal process with a maximum of 2 inches at the bottom and a minimum of 1 inch at the top. This raceway must be cleared to allow installation of the street lighting cables. A rod, chain, or other device will be passed through this raceway after fabrication of the post. A blocked raceway or partially blocked raceway shall be cause for rejection of the post. Posts shall be cured with low temperature steam. Following steam curing, the posts shall not be subjected to severe temperature changes during the early days of curing.

Posts shall have an overall length as specified and shall be tapered, hexagonal in shape and monolithic in construction with a minimum outside bottom dimension as specified across the flats and shall taper to 4 inches at the top of the post. An aluminum tenon designed to terminate the reinforcing and with tapped holes to accept securing bolts for the luminaire shall be installed at the top of the post. Posts will not normally have a Handhole opening unless specified. If specified, the handhole shall be 2 1/2" by 8" long and located approximately 18 inches on center up from the bottom of the post. A cast aluminum cover shall be furnished with the legend "CITY OF BOSTON" in raised lettering 1/16" thick and 1/2 inch wide.

The posts shall be equipped with a cast steel base plate 1 1/4" thick with a dimension of 14 1/2" by 14 1/2" with a 2 1/4" hole in the center of the base plate. Four (4) slotted holes with a dimension of 1 7/8" x 1 1/4" on a 17 inch bolt circle or 12 inch bolt square shall be provided in the base plate. The underside of the cast base plate shall be ribbed to decrease weight, increase strength and to make the installation of the post less difficult.

The complete post shall conform to and meet all current requirements of the National Electric Code, the National Electrical Manufacturers Association, the Illuminating Engineering Society, the American Standards Association, and the American Society for Testing Materials as each shall apply; and in addition the following standard shall apply:

EEI-NEMA Standards for Street Lighting Post strength and deflection Paragraph 3.2
ASTM Designation C131 for percentage of wear
ASTM Specification C150 H.E.S. Cement
ASTM Designation A416T Primary Reinforcing
ASTM Specification A615 Supplemental Steel Reinforcing
ASTM Designation A27Gr. N-2 (65-35) Cast Steel Anchor Base
ASTM Specification S5A-F, SG70A-T-6 or B26-50T - Fittings and Handhole Door
ASTM Designation C40 or C2950 Organic Impurities
ASTM Designation A153 Hot Dipped Galvanizing

Each post shall be equipped with two (2) #11 and two (2) #16 gauge metal shims to allow adjustment of the post on the concrete subbase. A stamped metal tag 1 1/4 inches by 5 inches long shall be securely attached to the post approximately 60 inches above the base plate with the legend as noted on the drawings.

TESTING

The Contractor shall be responsible for submitting all test data required under these items and as called for in the specifications to the Boston PWD, Street Lighting Division. Under no conditions shall a final acceptance of any lighting system be authorized until all required engineering test data has been submitted.

The post must be capable of holding without deformation or flexural cracking a luminaire or luminaires up to a maximum of three with a gross weight of 75 pounds each with a projected area of 3.1 square feet (each unit). The luminaires and bracket arms are of the slip over type and exert maximum loading on the post on the upper 24 inches of the post. Special reinforcing and strengthening of the upper section of the post is essential to prevent cracking or breaking of the post due to the whip-lash effect when the post is struck a glancing blow by a motor vehicle or when subjected to heavy wind loading. The entire unit including the post and up to three luminaires shall not crack or fail when subjected to basic wind pressure based on a height of 30 feet above ground level with unity drag factor, standard air, 100 mile per hour wind with a 1.3 gust factor. In addition, the post shall meet the minimum EEI-NEMA Standards for Street Lighting Posts under paragraph 3.2 Pole Strength and Deflection of sustaining a horizontal test load of 500 pounds applied 18 inches from the top of the shaft in any direction without failure of any component part with a deflection of not more than 7 1/2 % of the pole shaft length plus an allowance of 1/2 inch for testing methods and permanent set. Deflection is defined as the distance between the centerline of a post at the point of application and the location of the centerline of the post sustaining the test load.

Suppliers are advised that this test is a MANDATORY provision of these specifications and certified engineering data with regard to the result of these tests must be furnished before the first shipment of posts. This test must be duplicated when 25% of the order is complete, when 50% of the Order is complete and when 100% of the order is complete. Failure of the Manufacturer to perform these tests to insure that the posts meet the minimum requirements without failure of the posts may leave the Manufacturer with liability for defective posts.

The Manufacturer must furnish to the City of Boston detailed test data as to the damage that will be sustained by the post when in contact with a motor vehicle at speeds of 3, 5, 7, 10 and 15 miles per hour in a congested urban environment. Testing of the post should continue until "Knockdown" occurs. Testing of the posts shall be performed by a company suitable for this type of testing. Testing shall be reviewed and certified by a Registered Engineer. The criteria of the testing of the post shall be as follows: One (1) post shall be used for each test for the velocities designated above. The post shall be replaced after each increment of velocity to demonstrate the damage sustained by the post at the designated speeds. The quantity of posts used shall be determined by the damage these posts sustain until knockdown occurs.

INSTALLATION

The Contractor shall exercise special care in erecting hexagonal concrete light posts to ensure that they are firmly secured to the concrete base and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The post is to be erected in sections: the hexagonal concrete post, the pole base, the baseplate, the bracket arm(s) (if specified) and the luminaire(s). The shims furnished with the post shall be used if necessary. The street lighting post shall not be installed until the related control cabinet and related underground wiring have been completed and tested.

Post wiring and connections shall be installed as per Item 813.40, Wire Type 8 No. 10 Direct Burial.

METHOD OF MEASUREMENT

Post – Hexagonal Concrete, 14’-0” Post Height (MS), Post – Hexagonal Concrete, 19’-0” Post Height (MS), Post – Hexagonal Concrete, 24’-0” Post Height (MS) and Post – Hexagonal Concrete, 29’-0” Post Height (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Post – Hexagonal Concrete, 14’-0” Post Height (MS), Post – Hexagonal Concrete, 19’-0” Post Height (MS), Post – Hexagonal Concrete, 24’-0” Post Height (MS) and Post – Hexagonal Concrete, 29’-0” Post Height (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for post wiring and connections, but all costs in connection therewith shall be included in the Contract unit price bid.

Bracket Arms (if specified) and Luminaires shall be paid for under the appropriate items.

ITEM 821.921 BRACKET ARM – ORNAMENTAL EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of furnishing and installing ornamental bracket arms mounted on fluted steel posts (FSP), at the locations as shown on the plans or as directed by the Engineer.

MATERIALS AND FABRICATION

The details of these bracket arms are included on the Boston Street Lighting Standards, Details L.1.2.1, L.1.2.2, L.1.2.3 and L.1.2.4.

All materials and construction procedures shall conform to the specifications contained herein, Specification BCPTBA-300, BCPQABA-200 and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

All components of the ornamental bracket arm shall receive a shop wash coat of etching zinc chromate primer followed by two coats of oxide primer. Two finish coats of a high gloss black enamel paint of a type approved for outdoor use on metal shall be applied to all components after installation.

INSTALLATION

The Contractor shall exercise special care in erecting ornamental bracket arms to ensure that they are firmly secured to posts or structures and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The bracket arms of the luminaire must be installed so that they are parallel to the curb line of the street.

When installing an ornamental bracket arm, the following procedure for bonding shall be used. A single hole shall be drilled in the neck area of the post shaft capable of holding a 5/16” machine bolt and grounding lug. The bonding lug shall be attached to the inside of the neck and the incoming green bond shall be secured to it. In the bracket arm at the "Center Acorn”, a hole capable of holding a 5/16” machine bolt and bonding lug shall be drilled. The bonding lug shall then be attached to the inside of the bracket. All bonding leads from the luminaires shall be crimped together and a single green lead shall be secured to the bonding lug.

After installation of the complete post and bracket arm, the Contractor shall paint the installation with two (2) finish coats of a high gloss, black enamel paint of a type approved for outdoor use on metal.

METHOD OF MEASUREMENT

Bracket Arm –Ornamental will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Bracket Arm – Ornamental will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for wiring and connections, but all in connection therewith shall be included in the Contract unit price bid.

ITEM 821.951	BRACKET ARM – BOSTON BOULEVARD PENDANT STYLE, 5' LENGTH, SINGLE (MS)	EACH
ITEM 821.952	BRACKET ARM – BOSTON BOULEVARD PENDANT STYLE, 5' LENGTH, 2 @ 180 DEGREES (MS)	EACH
ITEM 821.953	BRACKET ARM – BOSTON BOULEVARD PENDANT STYLE, 4' LENGTH, SINGLE (MS)	EACH
ITEM 821.954	BRACKET ARM – BOSTON BOULEVARD PENDANT STYLE, 3' LENGTH, SINGLE (MS)	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under these items shall consist of furnishing and installing bracket arms for mounting street lighting luminaires on steel fluted steel posts (FSP) at the locations as shown on the plans or as directed by the Engineer.

MATERIALS AND FABRICATION

The details of these bracket arms are included on the Boston Street Lighting Standards, Details L.2.2.1, L.2.2.2, L.2.2.3 and L.2.2.4.

All materials and construction procedures shall conform to the Details on the plans, specifications contained herein, Specification BABBP-100, TBABBP-100, and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The Contractor shall supply the complete bracket arm and hardware, all necessary wiring and connections to make the unit fully operational, and paint. The Contractor shall be responsible for coordinating the acquisition of the equipment.

All components of the bracket arm shall receive a shop wash coat of etching zinc chromate primer followed by two (2) coats of oxide primer. Two (2) finish coats of a high gloss black enamel paint of a type approved for outdoor use on metal shall be applied to all components after installation.

INSTALLATION

The Contractor shall exercise special care in erecting cast bracket arms to ensure that they are firmly secured to posts or structures and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division.

All components of the bracket arm shall receive one (1) shop coat of an approved metal primer of a light color. Two (2) finish coats of a high gloss black enamel paint of a type

approved for outdoor use on metal shall be applied to all components after installation.

METHOD OF MEASUREMENT

Bracket Arm – Boston Boulevard Pendant Style, 5’ Length, Single (MS), Bracket Arm – Boston Boulevard Pendant Style, 5’ Length, 2 @ 180 Degrees (MS), Bracket Arm – Boston Boulevard Pendant Style, 4’ Length, Single (MS) and Bracket Arm – Boston Boulevard Pendant Style, 3’ Length, Single (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Bracket Arm – Boston Boulevard Pendant Style, 5’ Length, Single (MS), Bracket Arm – Boston Boulevard Pendant Style, 5’ Length, 2 @ 180 Degrees (MS), Bracket Arm – Boston Boulevard Pendant Style, 4’ Length, Single (MS) and Bracket Arm – Boston Boulevard Pendant Style, 3’ Length, Single (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for wiring and connections, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 821.961 BRACKET ARM – FORT POINT STYLE, 2 @ 180 DEGREES EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of furnishing and installing ornamental bracket arms mounted on fluted steel posts (FSP), at the locations as shown on the plans or as directed by the Engineer.

MATERIALS AND FABRICATION

The details of these bracket arms are included on the Boston Street Lighting Standards, Detail L.4.2.1.

All materials and construction procedures shall conform to the requirements and standard practices of the Boston PWD, Street Lighting Division.

All components of the bracket arm shall receive a shop wash coat of etching zinc chromate primer followed by two coats of oxide primer. Two finish coats of a high gloss black enamel paint of a type approved for outdoor use on metal shall be applied to all components after installation.

INSTALLATION

The Contractor shall exercise special care in erecting bracket arms to ensure that they are firmly secured to posts or structures and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The bracket arms of the luminaire must be installed so that they are parallel to the curb line of the street.

All components of the bracket arm shall receive one (1) shop coat of an approved metal primer of a light color. Two (2) finish coats of a high gloss black enamel paint of a type approved for outdoor use on metal shall be applied to all components after installation.

METHOD OF MEASUREMENT

Bracket Arm – Fort Point Style, 2 @ 180 Degrees will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Bracket Arm – Fort Point Style, 2 @ 180 Degrees will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for wiring and connections, but all in connection therewith shall be included in the Contract unit price bid.

ITEM 821.971	BRACKET ARM – ALUMINUM HEXAGONAL, 6' LENGTH, SINGLE (MS)	EACH
ITEM 821.972	BRACKET ARM – ALUMINUM HEXAGONAL, 6' LENGTH, TWIN (MS)	EACH
ITEM 821.973	BRACKET ARM – ALUMINUM HEXAGONAL, 6' LENGTH, TRIPLE (MS)	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of furnishing and installing aluminum bracket arms mounted on 24'-0" or 29'-0" hexagonal concrete posts or on a metal post equipped with a hexagonal to round cast aluminum adaptor, at the locations as shown on the plans or as directed by the Engineer.

MATERIALS AND FABRICATION

The details of these bracket arms are included on the Boston Street Lighting Standards, Details L.3.3.1, L.3.3.2 and L.3.3.3

All materials and construction procedures shall conform to the specifications contained herein, Specification BAS-200 and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The complete bracket arm for mounting a single street lighting luminaire shall consist of a cast aluminum post fitting designed to slip over the top section of a standard pre-cast concrete post with a hexagonal cross section at the top. The casting shall include a section extending from the main body of the unit designed to accept seamless pipe mounting arm.

The casting for the twin bracket for mounting two luminaires shall be similar to that used for one unit with the exception that it shall be designed to have two sections extending from the main body of the unit 180 degrees apart to accept two sections of seamless aluminum pipe.

The casting for the triple bracket arm for mounting three luminaires shall be similar to that used for the single unit with the exception that it shall be designed to have three sections extending from the main body of the unit to accept three sections of seamless aluminum pipe.

The casting for all three units shall be constructed using virgin aluminum metal free from dents, cracks, mold marks and imperfections and shall be constructed so as to assure ease of mounting and ensure a firm, even grip on the post. The casting shall be equipped with three (3) 3/8" x 3/4" stainless steel hex head bolts designed to bear against the post. The post fitting casting shall bear the legend "CITY OF BOSTON" in letters with a maximum height

of 3/8”.

The mounting arm for the single, twin and triple bracket arms shall be constructed of new seamless aluminum pipe and shall be free from imperfections and dents. The pipe shall be slip fitted into the section extending from the main body of the post fitting casting and shall be securely welded to the casting. The weld shall be free from flux and spatter. The mounting arm shall extend from the end of casting to the end of the pipe.

The complete bracket arm shall be free from all rough spots, mold marks and other imperfections and shall be furnished with a natural aluminum finish.

The complete bracket shall conform to and meet all current requirements of the National Electric Code, the National Electrical Manufacturers Association, Illuminating Engineering Society, American Standards Association and the American Society for Testing Materials (ASTM) as each shall apply; and in addition the following standard shall apply:

ASTM Specification B-241-58T, GS 10-AT6 – Pipe and Weld
ASTM Specification S-5A-F, SG 70A-t6 – Aluminum for Assembly
ASTM Specification GM 70B – Aluminum for Assembly

TESTING

The Contractor shall be responsible for submitting all test data required under these items and as called for in the specifications to the Boston PWD, Street Lighting Division. Under no conditions shall a final acceptance of any lighting system be authorized until all required engineering test data has been submitted.

The complete bracket arm assembly shall be capable of holding without deformation or cracking, one street lighting luminaire with a projected area of 3.0 square feet and a weight of 75 pounds, two street lighting units mounted at 180 degrees from each other with a projected area of 3.0 square feet and a weight of 75 pounds (each unit); two street lighting units mounted parallel to each other with a distance of 7’-10” between each luminaire, with a projected area of 3.0 square feet and a weight of 75 pounds (each unit); and three street lighting luminaires mounted at 90 degrees from each other with a projected area of 3.0 square feet and a weight of 75 pounds (each unit). The above loading shall be safely accomplished with a minimum safety factor yield strength of 1.82 for weight loan and basic wind pressure based on the following: height of 30 feet above ground level; unity drag factor, standard air, 100 mile per hour wind with a 1.3 gust factor, the bracket arm shall be capable of withstanding a side load of 50 pounds with a deflection at the end of the bracket arm and a momentary vertical load of 250 pounds without collapse or rupture.

Suppliers are advised that this test is a MANDATORY provision of these specifications and certified engineering data with regard to the result of these tests must be furnished before the first shipment of posts. This test must be duplicated when 25% of the order is complete, when 50% of the Order is complete and when 100% of the order is complete. Failure of the Manufacturer to perform these tests to insure that the posts meet the minimum requirements

without failure of the posts may leave the Manufacturer with liability for defective posts.

INSTALLATION

The Contractor shall exercise special care in erecting aluminum bracket arms to ensure that they are firmly secured to posts or structures and plumbed in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division.

The bracket arm is intended for mounting standard street lighting units on a 24'-0" or 29'-0" overall mounting height standard concrete post or on a metal post when equipped with a hexagonal to round cast aluminum adaptor. The post will have a hexagonal cross section. When used on a metal post, an adaptor made of cast aluminum, will slip inside the metal post and will adapt the post to accept the bracket designed for mounting on a hexagonal post. The bracket shall be of the slip-over type designed to slip over the top section of the post.

The bracket arm shall consist of a cast aluminum post fitting designed to be secured to the post by means of stainless-steel hex head bolts bearing against the post. The mounting arms shall be constructed of aluminum pipe for all arms. The bracket arm(s) shall be securely welded to the cast aluminum post fitting.

The bracket arm shall be designed for single and multiple mounting of street lighting units as follows: single bracket arm for mounting one luminaire on an arm extending from the casting; twin bracket arm for mounting two luminaires on arms extending from the casting at 180 degrees from each other; and a triple arm for mounting three luminaires on arms extending from the casting 90 degrees from each other.

METHOD OF MEASUREMENT

Bracket Arm – Aluminum Hexagonal, 6' Length, Single (MS), Bracket Arm – Aluminum Hexagonal, 6' Length, Twin (MS) and Bracket Arm – Aluminum Hexagonal, 6' Length, Triple (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Bracket Arm – Aluminum Hexagonal, 6' Length, Single (MS), Bracket Arm – Aluminum Hexagonal, 6' Length, Twin (MS) and Bracket Arm – Aluminum Hexagonal, 6' Length, Triple (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for wiring and connections, but all in connection therewith shall be included in the Contract unit price bid.

ITEM 823.951 LUMINAIRE – ARCHITECTURAL AREA, 100W LED (MS) EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under these items shall consist of furnishing and installing street lighting luminaires on hexagonal concrete posts at the locations as shown on the plans or as directed, complete in place.

MATERIALS and FABRICATION

The details of these Architectural Area luminaires are included on the Boston Street Lighting Standards, Details L.3.1.1, L.3.1.2 and L.8.1.

All materials and construction procedures shall conform to the requirements and standard practices of the Boston PWD, Street Lighting Division, or as directed by the Engineer.

The complete luminaire shall include all elements described on the Boston Street Lighting Standards, Details L.3.1.1 and L.3.1.2, including (but not limited to) the aluminum single-cast body, the photocontrol receptacle, the integrated LED, the light level controls, the power supply and the surge protectors.

The complete luminaire shall conform to and meet all the current requirements of the National Electrical Manufacturers Association; American Standards Association; The Illuminating Engineering Society; and the National Electric Code, wherever such standards shall apply, and in addition the following standard shall apply:

Materials shall be of Cast Aluminum Alloy #319

A stamped metallic aluminum tag approximately 1-1/2" x 3" long, bearing the legend as follows shall be affixed inside the luminaire:

PROPERTY OF CITY OF BOSTON
PUBLIC WORKS DEPARTMENT
Serial No. BBC (*)-1 thru (*)-total number furnished(*)
Date of Manufacture
Installed Date

A permanent type adhesive shall be used to securely affix the tag at a location where it can be readily observed inside the luminaire. A surface that will take writing from a ballpoint pen or pencil, which may consist of a small adhesive label attached to the metal tag, shall be used for the purpose of indicating the installed date.

Photocell

Photocells shall consist of a UV stabilized, outdoor rated and flame resistant polymer housing material and shall have an operating temperature range of -40C to +70C. The housing enclosure rating shall be IP66 under IEC 60529 and impact rating shall be IK08 (completely dust-tight and protected against water pressure from any direction).

The photocell shall have a voltage range of 120-480 V, a surge rating of kV/10 kA Type C and an average power consumption of 1 W.

Photocells must be secure, consisting of AES 128/256 encryption TLS 1.2, a Dedicated Security Controller and be Common Criteria Certified EAL6+ (high). They must provide secure management of certificates and support device authentication. Photocells must provide photocell control (automated and astronomical scheduling with adjustable offsets) and dimming control.

Photocells conform to and meet all the following requirements and standards:

Metrology: ANSI C136.5-C12.20
Safety: UL773*
FCC: Title 47 Part 15, Class A
DALI Alliances: DALI II D4i
PTCRB: IoT certified, AT&T
ROHS: Compliant
UL: Listed to U.S. and Canadian safety standards

INSTALLATION

The Contractor shall exercise special care in installing the Luminaire – Architectural Area to ensure that it is firmly attached to concrete post in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The street light luminaire shall not be installed until the related control cabinet and underground wiring has been completed and tested.

Street Light installations shall be fused in the luminaire. No fusing shall be allowed in the base of the post or in the pullbox.

All wiring shall be complete and shall only require attachment of the power supply leads. All power supply leads shall be clearly identified by means of permanently attached metal tags. A color lead for bonding the luminaire shall be furnished with each unit in addition to the power supply leads. Any required splicing in the luminaire shall be accomplished with insulated, compression type connectors. Under NO CONDITIONS shall wire nuts or non-compression type connectors be allowed.

Street Lighting Luminaires shall be wired with #10 AWG cable as per specification with a fused street light connector and with appropriate fuse in the power lead. All cables shall be

identified with the appropriate colored marking tape. All leads shall be continuous from the pullbox to the post top. Neutral and Bond leads shall be connected using insulated pressure connectors. Power leads from the pullbox to the luminaire shall be for 120 volts only. Under no conditions shall more than a 120 volt lead be brought to any post.

METHOD OF MEASUREMENT

Luminaire – Architectural Area, 100W LED (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Luminaire – Architectural Area, 100W LED (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment, and incidental costs required to complete the work. No separate payment will be made for the lamp, photocontrol receptacle, photocells, wiring and connections, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 823.952	LUMINAIRE – BOULEVARD JR PENDANT STYLE K705, 75W LED (MS)	EACH
ITEM 823.955	LUMINAIRE – BOULEVARD PENDANT STYLE K805, 150W LED (MS)	EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under these items shall consist of furnishing and installing street lighting luminaires mounted on aluminum bracket arms that are to be mounted on fluted steel posts (FSP), at the locations as shown on the plans or as directed, complete in place.

MATERIALS and FABRICATION

The details of these Boulevard Pendant Style luminaires are included on the Boston Street Lighting Standards, Details L.2.1.1, L.2.1.2 and L.8.1.

All materials and construction procedures shall conform to the specifications contained herein, Specification LSBBPTE-LED-100, PESLC-200, and to the requirements and standard practices of the Boston PWD, Street Lighting Division, or as directed by the Engineer.

The complete luminaire shall include all elements described on the Boston Street Lighting Standards, Details L.2.1.1 and L.2.1.2, including (but not limited to) the photocontrol receptacle finials, the decorative aluminum elements, the glass lens, the heavy wall cast aluminum body, the driver assembly and the locking latch.

The complete luminaire shall conform to and meet all the current requirements of the National Electrical Manufacturers Association; American Standards Association; The Illuminating Engineering Society; and the National Electric Code, wherever such standards shall apply, and in addition the following standard shall apply:

Materials shall be of Cast Aluminum Alloy #319

A stamped metallic aluminum tag approximately 1-1/2" x 3" long, bearing the legend as follows shall be affixed inside the luminaire:

PROPERTY OF CITY OF BOSTON
PUBLIC WORKS DEPARTMENT
Serial No. BBC (*)-1 thru (*)-total number furnished(*)
Date of Manufacture
Installed Date

A permanent type adhesive shall be used to securely affix the tag at a location where it can be readily observed inside the luminaire. A surface that will take writing from a ballpoint pen or pencil, which may consist of a small adhesive label attached to the metal tag, shall be used for the purpose of indicating the installed date.

Lamps used in conjunction with the luminaires must be supplied by a recognized, major lamp manufacturer. All lamps must be supplied by the same manufacturer and lot number.

Photocell

Photocells shall consist of a UV stabilized, outdoor rated and flame resistant polymer housing material and shall have an operating temperature range of -40C to +70C. The housing enclosure rating shall be IP66 under IEC 60529 and impact rating shall be IK08 (completely dust-tight and protected against water pressure from any direction).

The photocell shall have a voltage range of 120-480 V, a surge rating of kV/10 kA Type C and an average power consumption of 1 W.

Photocells must be secure, consisting of AES 128/256 encryption TLS 1.2, a Dedicated Security Controller and be Common Criteria Certified EAL6+ (high). They must provide secure management of certificates and support device authentication. Photocells must provide photocell control (automated and astronomical scheduling with adjustable offsets) and dimming control.

Photocells conform to and meet all the following requirements and standards:

Metrology: ANSI C136.5-C12.20
Safety: UL773*
FCC: Title 47 Part 15, Class A
DALI Alliances: DALI II D4i
PTCRB: IoT certified, AT&T
ROHS: Compliant
UL: Listed to U.S. and Canadian safety standards

INSTALLATION

The Contractor shall exercise special care in installing both the Luminaire – Boulevard JR Pendant Style K705 and the Luminaire – Boulevard Pendant Style K805 to ensure that they are firmly attached to the bracket arm in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The street light luminaire shall not be installed until the related control cabinet and underground wiring has been completed and tested.

Street Light installations shall be fused in the luminaire above the ballast assembly. No fusing shall be allowed in the base of the post or in the pullbox.

All wiring shall be complete and shall only require attachment of the power supply leads. All power supply leads shall be clearly identified by means of permanently attached metal tags. A color lead for bonding the luminaire shall be furnished with each unit in addition to the power supply leads. Any required splicing in the luminaire shall be accomplished with insulated, compression type connectors. Under NO CONDITIONS shall wire nuts or non-compression type connectors be allowed.

Street Lighting Luminaires shall be wired with #10 AWG cable as per specification with a fused street light connector and with appropriate fuse in the power lead. All cables shall be identified with the appropriate colored marking tape. All leads shall be continuous from the pullbox to the post top. Neutral and Bond leads shall be connected using insulated pressure connectors. Power leads from the pullbox to the luminaire shall be for 120 volts only. Under no conditions shall more than a 120 volt lead be brought to any post.

METHOD OF MEASUREMENT

Luminaire – Boulevard JR Pendant Style K705, 75W LED (MS) and Luminaire – Boulevard Pendant Style K805, 150W LED (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Luminaire – Boulevard JR Pendant Style K705, 75W LED (MS) and Luminaire – Boulevard Pendant Style K805, 150W LED (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment, and incidental costs required to complete the work. No separate payment will be made for lamps, the photocontrol receptacle, photocells, wiring and connections, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 823.962 LUMINAIRE – FORT POINT STYLE, 100W LED SINGLE (MS) EACH

GENERAL

Work under this item shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

The work under this item shall consist of furnishing and the installation of street lighting luminaires mounted on fluted steel posts (FSP), at the locations as shown on the plans or as directed, complete in place.

MATERIALS and FABRICATION

The details of the Fort Point Style luminaires are included on the Boston Street Lighting Standards Detail L.4.1.1.

All materials and construction procedures shall conform to the specifications contained herein, Specification LBFP-100, and attached details and to the requirements and standard practices of the Boston PWD, Street Lighting Division, or as directed by the Engineer.

Luminaire shall be seeded acrylic as shown on Details. Lamp 100 WATT CREE LED system, type III asymmetric distribution, color temp 4000K.

Finish – Prime paint then finish paint black.

The complete luminaire shall conform to and meet all the current requirements of the National Electrical Manufacturers Association; American Standards Association; The Illuminating Engineering Society; and the National Electric Code, wherever such standards shall apply, and in addition the following standards shall apply.

ASTM A48 - Class 30 for Solid Cast Iron

A stamped metallic aluminum tag approximately 1-1/2" x 3" long, bearing the legend as follows shall be affixed inside the luminaire:

PROPERTY OF CITY OF BOSTON
PUBLIC WORKS DEPARTMENT
Serial No. BNCLED (*)-l thru (*)-total number furnished(*);
Date of Manufacture
Installed Date

A permanent type adhesive shall be used to securely affix the tag at a location where it can be readily observed inside the luminaire. A surface that will take writing from a ball-point pen or pencil, which may consist of a small adhesive label attached to the metal tag to be used for the purpose of indicating the installed date.

Lamps to be used with this luminaire must be supplied by a recognized, major lamp manufacturer. All lamps must be supplied by the same manufacturer and must be of the same lot number.

INSTALLATION

The Contractor shall exercise special care in installing Luminaire - Fort Point Style to ensure that it is firmly attached to the post top tenon and level in accordance with the details shown on the plans and to the satisfaction of the Engineer and the Boston PWD – Street Lighting Division. The street light luminaire shall not be installed until the related control cabinet and underground wiring has been completed and tested.

Street Light Installations shall be fused at the luminaire beneath the ballast assembly. No fusing shall be allowed in the base of the post or in the pullbox.

All wiring shall be complete and shall only require attachment of the power supply leads. All power supply leads shall be clearly identified by means of permanently attached metal tags. A color lead for bonding the luminaire shall be furnished with each unit in addition to the power supply leads. Any required splicing in the luminaire shall be accomplished with insulated, compression type connectors. Under co conditions shall wire nuts or non – compression type connectors be allowed.

Street Lighting Luminaires shall be wired with #10 AWG cable as per specification with a fused street light connector and with appropriate fuse in the power lead. All cables shall be identified with the appropriate colored marking tape. All leads shall be continuous from the pullbox to the post top. Neutral and Bond leads shall be connected using insulated pressure connectors. Power leads from the pullbox to the luminaire shall be for 120 volts only. Under no conditions shall more than a 120 volt lead be brought to any post.

If the unit is to be used with a bracket arm, all splicing shall be performed in the center “Hub” of the bracket arm. At the center “Hub”, the power leads from the multiple fixtures shall be connected together with insulated crimp connectors, which shall in turn be connected to the incoming power lead from the pullbox. Sufficient slack wire shall be provided to allow cables to extend 10” beyond the center “Hub” in the bracket so that splices can be made outside the post.

METHOD OF MEASUREMENT

Luminaire – Fort Point Style, 100W LED Single will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Luminaire – Fort Point Style, 100W LED Single (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs to

complete the work. No separate payment will be made for the lamp, wiring and connections, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 823.971 LUMINAIRE – COBRA STYLE, 100W LED (MS) EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under these items shall consist of furnishing and installing street lighting luminaires on hexagonal concrete posts at the locations as shown on the plans or as directed, complete in place.

MATERIALS and FABRICATION

The details of these Architectural Area luminaires are included on the Boston Street Lighting Standards Details L.7.1 and L.8.1.

All materials and construction procedures shall conform to the requirements and standard practices of the Boston PWD, Street Lighting Division, or as directed by the Engineer.

The complete luminaire shall include all elements described on the Boston Street Lighting Standards, Details L.7.1 and L.8.1, including (but not limited to) the aluminum single-cast body, the photocontrol receptacle, the LED, the optional performance selector, the power supply and the surge protectors.

The complete luminaire shall conform to and meet all the current requirements of the National Electrical Manufacturers Association; American Standards Association; The Illuminating Engineering Society; and the National Electric Code, wherever such standards shall apply, and in addition the following standard shall apply:

Materials shall be of Cast Aluminum Alloy #319

A stamped metallic aluminum tag approximately 1-1/2" x 3" long, bearing the legend as follows shall be affixed inside the luminaire:

PROPERTY OF CITY OF BOSTON
PUBLIC WORKS DEPARTMENT
Serial No. BBC (*)-1 thru (*)-total number furnished(*)
Date of Manufacture
Installed Date

A permanent type adhesive shall be used to securely affix the tag at a location where it can be readily observed inside the luminaire. A surface that will take writing from a ballpoint pen or pencil, which may consist of a small adhesive label attached to the metal tag, shall be used for the purpose of indicating the installed date.

Photocell

Photocells shall consist of a UV stabilized, outdoor rated and flame resistant polymer housing material and shall have an operating temperature range of -40C to +70C. The housing enclosure rating shall be IP66 under IEC 60529 and impact rating shall be IK08 (completely dust-tight and protected against water pressure from any direction).

The photocell shall have a voltage range of 120-480 V, a surge rating of kV/10 kA Type C and an average power consumption of 1 W.

Photocells must be secure, consisting of AES 128/256 encryption TLS 1.2, a Dedicated Security Controller and be Common Criteria Certified EAL6+ (high). They must provide secure management of certificates and support device authentication. Photocells must provide photocell control (automated and astronomical scheduling with adjustable offsets) and dimming control.

Photocells conform to and meet all the following requirements and standards:

Metrology: ANSI C136.5-C12.20
Safety: UL773*
FCC: Title 47 Part 15, Class A
DALI Alliances: DALI II D4i
PTCRB: IoT certified, AT&T
ROHS: Compliant
UL: Listed to U.S. and Canadian safety standards

INSTALLATION

The Contractor shall exercise special care in installing the Luminaire – Cobra Style to ensure that it is firmly attached to bracket arm to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The street light luminaire shall not be installed until the related control cabinet and underground wiring has been completed and tested.

Street Light installations shall be fused in the luminaire. No fusing shall be allowed in the base of the post or in the pullbox.

All wiring shall be complete and shall only require attachment of the power supply leads. All power supply leads shall be clearly identified by means of permanently attached metal tags. A color lead for bonding the luminaire shall be furnished with each unit in addition to the power supply leads. Any required splicing in the luminaire shall be accomplished with insulated, compression type connectors. Under NO CONDITIONS shall wire nuts or non-compression type connectors be allowed.

Street Lighting Luminaires shall be wired with #10 AWG cable as per specification with a fused street light connector and with appropriate fuse in the power lead. All cables shall be identified with the appropriate colored marking tape. All leads shall be continuous from the

pullbox to the post top. Neutral and Bond leads shall be connected using insulated pressure connectors. Power leads from the pullbox to the luminaire shall be for 120 volts only. Under no conditions shall more than a 120 volt lead be brought to any post.

METHOD OF MEASUREMENT

Luminaire – Cobra Style, 100W LED (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Luminaire – Cobra Style, 100W LED (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment, and incidental costs required to complete the work. No separate payment will be made for the lamp, photocontrol receptacle, photocells, wiring and connections, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 823.980 LUMINAIRE – COLONIAL ELECTRIC, 100W M.H. SINGLE (MS) EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of furnishing and installing street lighting luminaires mounted on cast iron posts (CIP), at the locations as shown on the plans or as directed, complete in place.

MATERIALS and FABRICATION

The details of this colonial electric luminaire are included on the Boston Street Lighting Standards, Details L.5.1 and L.8.1.

All materials and construction procedures shall conform to the specifications contained herein, Specification ECPTL-100, BACTPT-400, PESLC-BT-200, and to the requirements and standard practices of the Boston PWD, Street Lighting Division, or as directed by the Engineer.

The complete luminaire shall include all elements described on the Boston Street Lighting Standards Details L.5.1 and L.8.1, including (but not limited to) the photocontrol receptacle, glass windows/frames, the colonial style upper spinning, the porcelain lampholder, the galvanized and powder coated copper frames and the copper top vent assembly.

The complete luminaire shall conform to and meet all the current requirements of the National Electrical Manufacturers Association; American Standards Association; The Illuminating Engineering Society; and the National Electric Code, wherever such standards shall apply.

A Stamped metallic aluminum tag approximately 1-1/2” x 3” long, bearing the legend as follows shall be affixed inside the luminaire:

PROPERTY OF THE CITY OF BOSTON
PUBLIC WORKS DEPARTMENT
Serial No. BNCL (*)-1 thru (*)-total number furnished(*)
Date of Manufacture
Installed Date

A permanent type adhesive shall be used to securely affix the tag at a location where it can be readily observed inside the luminaire. A surface that will take writing from a ballpoint pen or pencil, which may consist of a small adhesive label, shall be attached to the metal tag to be used for the purpose of indicating the installed date.

Photocell

Photocells shall consist of a UV stabilized, outdoor rated and flame resistant polymer housing material and shall have an operating temperature range of -40C to +70C. The housing enclosure rating shall be IP66 under IEC 60529 and impact rating shall be IK08 (completely dust-tight and protected against water pressure from any direction).

The photocell shall have a voltage range of 120-480 V, a surge rating of kV/10 kA Type C and an average power consumption of 1 W.

Photocells must be secure, consisting of AES 128/256 encryption TLS 1.2, a Dedicated Security Controller and be Common Criteria Certified EAL6+ (high). They must provide secure management of certificates and support device authentication. Photocells must provide photocell control (automated and astronomical scheduling with adjustable offsets) and dimming control.

Photocells conform to and meet all the following requirements and standards:

Metrology: ANSI C136.5-C12.20
Safety: UL773*
FCC: Title 47 Part 15, Class A
DALI Alliances: DALI II D4i
PTCRB: IoT certified, AT&T
ROHS: Compliant
UL: Listed to U.S. and Canadian safety standards

INSTALLATION

The Contractor shall exercise special care in installing Luminaire-Colonial Electric to ensure that it is firmly attached to post top tenon and level in accordance with the Details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The street light luminaire shall not be installed until the related control cabinet and underground wiring has been completed and tested.

Street Light installations shall be fused at the top of the post. No fusing shall be allowed in the base of the post or in the pullbox.

All wiring shall be complete and shall only require attachment of the power supply leads. All power supply leads shall be clearly identified by means of permanently attached metal tags. A color lead for bonding the luminaire shall be furnished with each unit in addition to the power supply leads. Any required splicing in the luminaire shall be accomplished with insulated, compression type connectors. Under NO CONDITIONS shall wire nuts or non-compression type connectors be allowed.

Internal fixture wiring shall be 600 VAC rated-heat resistant type, #14 AWG, and shall be appropriately color-coded to match ballast leads. Ballast leads shall be long enough to run

to the chimney/socket assembly, where all connections shall be made. Wiring shall be encased in a 1/2 inch mold loom for additional protection and binding. The loom shall be secured along the inner lantern frame to one side of the door by copper tabs provided for the purpose.

Street Lighting Luminaires shall be wired with #10 AWG cable as per specification with a fused street light connector and with appropriate fuse in the power lead. All cables shall be identified with the appropriate colored marking tape. All leads shall be continuous from the pullbox to the post top. Neutral and Bond leads shall be connected using insulated pressure connectors. Power leads from the pullbox to the luminaire shall be for 120 volts only. Under no conditions shall more than a 120 volt lead be brought to any post.

METHOD OF MEASUREMENT

Luminaire – Colonial Electric, 100W M.H. Single (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Luminaire – Colonial Electric, 100W M.H. Single (MS) will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for the lamp, photocontrol receptacle, photocells, wiring and connections, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 823.999 LUMINAIRE – NEIGHBORHOOD ACORN STYLE, 100W LED SINGLE (MS) EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall consist of furnishing and installing street lighting luminaires mounted on fluted steel posts (FSP), at the locations as shown on the plans or as directed, complete in place.

MATERIALS and FABRICATION

The details of the cast iron BNC luminaire are included on the Boston Street Lighting Standards Details L.1.1 and L.8.1.

All materials and construction procedures shall conform to the specifications contained herein, Specification LBCNCLED-100-100, PESLC-BT-200, and to the requirements and standard practices of the Boston PWD, Street Lighting Division, or as directed by the Engineer.

The complete luminaire shall include all elements described on the Boston Street Lighting Standards, Details L.1.1 and L.8.1, including (but not limited to) the photocontrol receptacle finial, the lamp, the ballast assembly, and the refractor.

The complete luminaire shall conform to and meet all current requirements of the American Standards Association and the American Society for Testing Materials as each shall apply; and in addition the following standard shall apply:

ASTM A48 - Class 30 for Grey Cast Iron

A stamped metallic aluminum tag approximately 1-1/2" x 3" long, bearing the legend as follows shall be affixed inside the luminaire:

PROPERTY OF CITY OF BOSTON
PUBLIC WORKS DEPARTMENT
Serial No. BNCLED (*)-l thru (*)-total number furnished(*);
Date of Manufacture
Installed Date

A permanent type adhesive shall be used to securely affix the tag at a location where it can be readily observed inside the luminaires. A surface that will take writing from a ball-point pen or pencil, which may consist of a small adhesive label attached to the metal tag, shall be used for the purpose of indicating the installed date.

Lamps used in conjunction with the luminaires must be supplied by a recognized, major lamp manufacturer. All lamps must be supplied by the same manufacturer and lot number.

Photocell

Photocells shall consist of a UV stabilized, outdoor rated and flame resistant polymer housing material and shall have an operating temperature range of -40C to +70C. The housing enclosure rating shall be IP66 under IEC 60529 and impact rating shall be IK08 (completely dust-tight and protected against water pressure from any direction).

The photocell shall have a voltage range of 120-480 V, a surge rating of kV/10 kA Type C and an average power consumption of 1 W.

Photocells must be secure, consisting of AES 128/256 encryption TLS 1.2, a Dedicated Security Controller and be Common Criteria Certified EAL6+ (high). They must provide secure management of certificates and support device authentication. Photocells must provide photocell control (automated and astronomical scheduling with adjustable offsets) and dimming control.

Photocells conform to and meet all the following requirements and standards:

Metrology: ANSI C136.5-C12.20
Safety: UL773*
FCC: Title 47 Part 15, Class A
DALI Alliances: DALI II D4i
PTCRB: IoT certified, AT&T
ROHS: Compliant
UL: Listed to U.S. and Canadian safety standards

INSTALLATION

The Contractor shall exercise special care in installing Luminaire – Neighborhood Acorn Style to ensure that it is firmly attached to the post top tenon and level in accordance with the details shown on the plans and to the satisfaction of the Engineer and the Boston PWD, Street Lighting Division. The street light luminaire shall not be installed until the related control cabinet and underground wiring has been completed and tested.

Street light installations shall be fused at the cast iron post fitter beneath the driver assembly. No fusing shall be allowed in the base of the post or in the pullbox.

All wiring shall be complete and shall only require attachment of the power supply leads. All power supply leads shall be clearly identified by means of a permanently attached metal tag. A color lead for bonding the luminaire shall be furnished with each unit in addition to the power supply leads. Any required splicing in the luminaire shall be accomplished with insulated, compression type connectors. Under no conditions shall wire nuts or non-compression type connectors be allowed.

Street Lighting Luminaires shall be wired with #10 AWG cable as per specification with a fused street light connector and with appropriate fuse in the power lead. All cables shall be identified with the appropriate colored marking tape. All leads shall be continuous from the pullbox to the post top. Neutral and Bond leads shall be connected using insulated pressure connectors. Power leads from the pullbox to the luminaire shall be for 120 volts only. Under no conditions shall more than a 120 volt lead be brought to any post.

If the unit is to be used with a bracket arm, all splicing shall be performed in the center "Acorn" of the bracket arm. At the center "Acorn", the power leads from the multiple fixtures shall be connected together with insulated crimp connectors, which shall in turn be connected to the incoming power lead from the pullbox. Sufficient slack wire shall be provided to allow cables to extend 10” beyond the center "Acorn" in the bracket so that splices can be made outside the post.

Luminaire wiring and connections shall be installed as per item 813.40, Wire Type 8 No. 10 Direct Burial.

METHOD OF MEASUREMENT

Luminaire – Neighborhood Acorn Style, 100W LED Single (MS) will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Luminaire – Neighborhood Acorn Style, 100-W LED Single will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment and incidental costs to complete the work. No separate payment will be made for the lamp, the photocontrol receptacle, photocells, wiring and connections, but all costs in connection therewith shall be included in the Contract unit price bid.

SECTION E

STREET LIGHTING CONTROLLER

ITEM 823.612 STREET LIGHTING CONTROLLER WITH ELECTRONIC CONTROLLED PANEL BOARD EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsections 813, 815, and 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under these items shall consist of installing Street Lighting Control Cabinets at the locations as shown on the plans or as directed, complete in place.

MATERIALS

The details of the street lighting controllers are included on the Boston Street Lighting Standards Details U.7.1, U.7.2, U.7.3.1, U.7.3.2, U.7.3.3, U.7.3.4, U.10, U.11, U.13 and U.14.

The complete specifications (SLCBMGA-100, PBA-100-36, PBSLC-500-100) are on file at the City of Boston Street Lighting Division and are hereby made a part of this specification.

Pre-Wired Panel Board Assembly

General:
The panel board assembly is intended for use in a municipally owned street lighting system for lighting public ways, parks, playgrounds and open spaces. The system is subject to severe environmental conditions, particularly adverse weather conditions and operations in a temperature range from -10 degrees to 105 degrees F. It is also subject to damage and deterioration from the elements, from contact with motor vehicles and vandalism. As part of this system, subject to these conditions it must be suitable for this use. It is imperative that the supplier of the proposed unit submit to the City of Boston a detailed listing of all components that will be used on the panel board to assure that the proposed items meet the specifications.

Testing and Compliance:
The unit shall conform to and meet all the current and revised requirements of the National Electric Code, the National Electrical Manufacturers Association, Illuminating Engineering Society, American Standards Association, and the American Society for Testing Material wherever such standards shall apply. The City of Boston shall be the sole judge regarding the acceptability of the various units in terms of the specifications herein.

In addition, the following specific standards shall apply as applicable:

All components used on this panel board shall be U.L. listed materials.

Prototype Samples and Production Samples:
Bidders and prospective bidders are encouraged to submit samples of units they propose to

furnish before the actual bidding so that the units can be evaluated and tested. This is especially important when the unit is custom design or custom modified unit and not a standard “off the shelf” item. Prototype samples may have certain hand made parts or features that will change when production commences, but the unit should be a working model complete in all aspects and closely resembling the actual production unit. This unit should not be considered a production sample. Advanced inspection and testing of the prototype or pre-bid unit will allow the supplier sufficient time to make any necessary changes in the unit to meet the specifications.

Production Samples:
Production samples of all units, along with the certified engineering data and written notification that the proposed units meet the City specifications must be furnished. Engineering drawings and specification sheets may be used to supplement the production sample, but it is to be expressly understood that they may not be used as a substitute for the production sample. Upon approval of the production sample and test data, delivery of the proposed units shall commence and no further changes or modifications, except for minor changes not affecting the operation or appearance will be allowed. In the event that a supplier fails to furnish a production sample prior to delivery of the proposed units, a unit will be selected at random from the first shipment and shall be considered a production sample. This unit will be evaluated and failure to meet the specifications will result in rejection of the entire lot. No further shipments will be allowed until a new production sample is furnished and found to conform with the specifications. All rejected material shall remain the property of the supplier and the City will assume no responsibility for shipment or storage charges. It is very important for the supplier to realize that submitting a production sample for evaluation before shipment of the main lot can avoid the unnecessary time and expense of returning a rejected shipment to the supplier and also the resultant delay in processing the necessary paperwork to pay the vendor.

Modification or Change to the Approved Unit:
In the event that a modification or change in the approved unit, or development of a new improved unit to replace the approved unit is announced by the supplier, written notification must be given to the City. An option to accept delivery of the modified unit or the new unit, or continued delivery of the approved unit must be given to the supplier by the City in writing. In no case shall delivery of the new or modified unit or continued delivery of the original approved unit result in any additional expense to the City.

Guarantee:
A written full two year replacement guarantee against defects in material and workmanship shall be furnished with each unit by the supplier. The guarantee period shall extend two years after installation of the unit or two years after delivery of the final unit whichever comes first as covered under a specific purchase order from the City.

Structural Defects:
Structural defects in any component shall be cause for replacement of the unit at the expense of the supplier. In general, this applies to units in service.

Component Defects:
Failure of any component of a unit which is capable of replacement may not require replacement of the entire unit, but only the failed component, is an option of the City. It is to be expressly understood that this is an option of the City and not an option of the supplier. In general, this applies to units in service and in storage.

Compensation:
The City expects to be compensated for the necessary labor of installing a new component to replace a failed component. The new component shall be furnished to the City at no cost and in lieu of money compensation the City may require a credit from the supplier or authorize a shipment of replacement parts above and beyond the actual number of failed components to compensate the City for the cost of replacing the failed components. It is to be expressly understood that this is an option of the City and not an option of the supplier.

This guarantee is not self limiting and automatically includes any published guarantee by a supplier for his/her product that exceeds the two year period.

Rejection Upon Delivery:
Large bulk shipments direct from the manufacturer to the City may upon examination at time of delivery, have obvious defects in quality and workmanship. The material may be rejected without unloading, particularly where the material would have to be unloaded by City forces and the unloading of material that obviously does not meet the specifications would be time consuming and expensive. The rejected items shall remain the property of the supplier and the City shall assume no responsibility for shipping or storage for rejected material.

Specifications:
The pre-wired panel board shall consist of a disconnect switch meter socket, wire trough, circuit breakers, magnetic contactors, lamp socket, astronomical time clock, and all other associated switches, fuses, wiring, etc. as per sketch.

All components of the panel board shall fit on to a plywood board 24” by 36”. The required design for the panel board can be seen on the sketch provided as part of this specification.

All components shall meet all the current and revised requirements of the National Electric Code, National Electrical Manufacturers Association, Illumination Engineering Society, American Standards Association, and the American Society for Testing Materials wherever such standards and tests shall apply.

General Requirements:
Listed below are the requirements of the panel board for control cabinets. Special attention is advised due to the limited space on the plywood board to make sure that equipment used will fit on the board.

The branch circuit breakers shall be rated for 100 amperes with a UL listing interrupting rating of 18,000 amperes symmetrical at 240 volts and shall be in accordance with federal Specification WC-375, Class 4B. The breaker shall be in an industrial type surface mounted

enclosure NEMA 1 with insulated bushings in all knockouts.

The meter socket shall be 100 amperes 5 terminal, and shall be compatible with the electrical meter installed by the Boston Edison Company. The offsets used with the meter socket shall have insulated bushings to prevent damage to the cable.

The main safety switch shall be 100 amperes, 2 pole, 3 wire, solid neutral, as indicated on details accompanying these specifications. All offsets and other bushings shall have insulated bushings to prevent damage to cables.

The contactors shall be unenclosed single phase, two pole, three wire open type magnetic contactors with a rating of 100 amperes, 120 volts, equipped with auxiliary contacts.

A standard single pole, double pole, maintained contact 10 amperes switch with center off position shall be installed in a handy box to allow switching from either le fog supply to energize the magnetic contactors.

An unfused grounded outlet modified to allow fuse protection for contactors only shall be mounted in a handy box.

A standard single pole, single throw, maintained contact, 10 ampere, 125 volt switch shall be installed in a handy box and used for the purpose of photocontrol override.

A standard single pole, single throw, maintained contact astronomical time switch 40 ampere, 120 volt, NEMA 3R enclosure, shall be installed on the panel board to back up and parallel the photocontrol. Tis unit must automatically compensate for sunrise and sunset changes throughout the year. Unit must be capable of sustaining internal clock operations during a power failure without loss of correct time for a minimum of sixteen hours.

The standard double pole, single throw, Corbin switch will be included but is not mounted upon the completed panel board. It will be mounted on the cast aluminum cabinet. The switch connections may be made and wiring to switch must be clearly identified.

All wire to be used in the installation of the panel board to the plywood board shall be of the size indicated and shall conform to the material requirements as specified by Spec. # SLC-400. Splicing procedures shall be as follows:

1. All cables shall have their insulation peeled back 3/4 inches from the end of their cables and shall be spliced using solderless crimp type connectors. The bared copper conductors and 3 inches of the insulation shall be cleaned General Requirements: with an electrician’s abrasive cloth. The cleaned insulation shall be coated with an approved electrical grade, fast drying sealant and bonding compound.

2. After allowing the electrical coating to dry tack-free, each coated jacket shall be wrapped using 1 layer of Aqua seal, 3 layers of rubber insulating tape, and 3 layers of electrical tape to insure a tight, waterproof, moisture-proof splice.

The conductors shall be joined with the appropriate solderless connector of the size indicated in the preceding listing. After the connection is made, the cables shall be spread apart to facilitate wrapping. Using the above wrapping procedure, a watertight wrap of several layers thickness shall be formed by lapping the tape through the spread cables and firmly around the connector. Upon completing this wrap, the spread cables shall be brought together maintaining a good seal along the centerline of the splice. The entire joint (connector and 3" of wrapped insulation) shall be overwrapped with several layers of electrical insulating tape and again be overwrapped with two layers of 7 milvinyl plastic electrical tape.

A porcelain lamp socket, medium base, with a 60 watt clear horizontal burning incandescent lamp shall be provided and installed as directed by the accompanying drawing. The lamp is to aid reading of the meter by utility personnel. The supplier is cautioned that the electrical components must satisfy electrical requirements but also dimensional requirements as well. All bushings with insulated throats are required in the wire trough, circuit breaker cans, disconnect switch, meter socket, handy boxes, and time switch. Under no circumstances shall wire nuts of any type be used. Specified sizes shown on attached sketches are the only ones that will be acceptable, to allow installation of the 24" x 36" backing board and to allow removal of the board through the door with all equipment installed.

The electrical equipment to be installed in the control cabinets shall be securely fastened to the backing board in a net and workmanlike manner. Electrical equipment shall be arranged upon the panel board and wired in accordance with the detail shown on the plans.

Upon the panel board, the supplier shall use a wire trough and bind wire groups together. Conductors shall be identified with circuit numbers using Brady band tags.

Additionally, all wires used for connection to the Edison leads (W, B, R, G), the street lighting circuits (R, B, DW, O, Y, W), the control light (R (2), BL), and the corbin switch (R (2), BL) and feed to the incandescent lamp shall be clearly identified and trail off the panel board at a minimum length of 2 feet.

The City of Boston shall be the sole judge regarding the acceptability of the various units in terms of the qualifications specified herein.

Dimensions:

A. Safety Switch – 100 Amp – 240 volt, 2 pole, 3 wire solid neutral NEMA Type 1 Enclosure.

B. Meter Socket – 100 Amp – with 5 terminal

C. Circuit Breakers – 100 Amp – 240 Volt – 2 pole – 3 wire – normally open with auxiliary contracts installed on contactor. Connectors to be supplied with contactors shall be suitable to hold up to 3-#2 AWG cables.

D. Lighting Contactors – 100 Amp – 120 Volt – 2 pole – 3 wire – normally open with auxiliary contacts installed on contactor. Connectors to be supplied with contactors shall be suitable to hold up to 3-#2 AWG cables.

E. Fused Single Convenience Receptacle – 15 amp fuse, grounded electrical outlet.

F. Porcelain Lamp Socket – Medium Base with 60 watt horizontal burning lamp clear.

G. SPDT Electric Switch – 10 Amp -125 Volt – maintained contact type switch with center position being OFF.

H. Single Pole Single Throw Electric Switch – 15 Amp – 125 Volt – maintained contact type switch.

I. Corbin Lock DPST Electric Switch – 15 Amp – 120-277 Volt rating – flush mounting, outside access on Street Lighting Control Cabinet.

J. Time Clock – 40 Amp Astronomical Time Switch – 40 Amp – 120 Volt – DPST electronic style – automatic set back to compensate for daylight savings time – 72 hour battery backup using a 9 volt alkaline battery NEMA 3 enclosure – battery to be supplied with clock – disconnected until installation by City forces.

K. Wire Trough – 4" X 4" X 24" – NEMA gray in color with end caps and cover.

Color Code for Panel Board:

Red – 120 Volt St. Lt….. (R)
Blue – 120 Volt St. Lt….. (B)
Yellow – 120 Volt St. Lt….. (Y)
Orange – 120 Volt St. Lt….. (0)
White – Neutral for St. Lt….. (W)
Double White – Neutral for St. Lt….. (DW)
Green – Bonding Wire….. (G)
Black – Feed for Photocell….. (BL)
Red (2) – Feed for Contactors….. (R(2))
Orange (2) – Feed for Incandescent Lamp….. (0(2))

CONSTRUCTION METHODS

The aluminum street lighting controller shall be installed a minimum of 12 inches from the front face of the curb with the door facing away from the roadway, or as directed by the Engineer. It shall be determined that no obstruction, including a light post, will interfere with opening, closing, or access to the controller.

The location, as shown on the plans, may be diagrammatic only, and the location should not

interfere with access to private property or detract from the general appearance of the area. The location shall also not inhibit pedestrian travel of the public way, including minimum barrier free access of 48 inches. The Contractor shall call to the attention of the Engineer a location that may look objectionable before commencing work at the controller site.

The electrical equipment to be installed in each controller shall be securely fastened to the backboard in a neat and workmanlike manner. Electrical equipment shall be arranged in the controller and wired in accordance with the wiring diagrams on the detail sheets, or as specified herein.

The Contractor shall submit for approval a wiring diagram of the controller interior. The Contractor shall install the necessary conduit from the controller to the appropriate Eversource manhole or standpipe connection and coordinate any necessary manhole breaks with Eversource.

The electrical connection, including any necessary cable, of the controller to the Eversource power supply shall be done by Eversource. This work by Eversource will include the manhole break, wiring, necessary splicing at the manhole and all other related items necessary for Eversource to make the connection.

Eversource shall provide the electrical service to the Controller. It shall be the responsibility of the Contractor to contact Eversource to arrange the electrical service to the manhole or standpipe. The cost for the electrical service shall be included in the bid price for this item.

Within the controller, the Contractor shall bind wire groups together; and all conductors shall be identified with circuit numbers using Brady brand tags.

The Controller shall be grounded to the ground rods by connecting the split top bolt grounding connector to the 42” length ground wire supplied as part of the controller base installation.

METHOD OF MEASUREMENT

Street Lighting Controller With Electronic Controlled Panel Board will be measured for payment by each unit installed, complete in place.

BASIS OF PAYMENT

Street Lighting Controller With Electronic Controlled Panel Board will be paid for at the Contract unit price for each unit, which price shall include all labor, materials, equipment, and incidental costs required to complete the work. No separate payment will be made for split top bolt ground connector, but all costs in connection therewith shall be included in the Contract unit price bid.

SECTION F

REMOVAL

ITEM 823.607 STREET LIGHTING CONTROLLER REMOVE AND TRANSPORT EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsections 813, 815, and 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall include the removal of the existing street lighting controller (s) and delivery of this equipment to the Boston PWD, Street Lighting Division, at the Street Lighting Facility at 430A Canterbury Street, Roslindale, 02131.

The existing street lighting controller, and appurtenances shall be carefully removed and transported. The cost for any damage done to this equipment, due to carelessness on the part of the Contractor will be back charged to the Contractor.

Forty-eight (48) hours prior to removal, the Contractor shall contact the Street Lighting Division at 617-635-7576 to arrange for the delivery to the Canterbury Street Facility.

METHOD OF MEASUREMENT

Street Lighting Controller Remove and Transport will be measured for payment by each unit removed and transported.

BASIS OF PAYMENT

Street Lighting Controller Remove and Transport will be paid for at the Contract unit price for each unit removed and transported, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for the loading, transportation and unloading of street lighting controllers and appurtenances, but all costs in connection therewith shall be included in the Contract unit price bid.

ITEM 823.72 STREET LIGHTING POST AND LUMINAIRE REMOVE AND TRANSPORT EACH

GENERAL

Work under these items shall conform to the relevant portions of Subsection 820 of the MassDOT Standard Specifications, the Boston Street Lighting Standards and to the requirements and standard practices of the Boston PWD, Street Lighting Division.

Work under this item shall include the removal of existing street lighting posts, bracket arms (if required), and luminaires and delivery of this equipment to the Boston PWD Street Lighting Facility, 340A Canterbury Street, Roslindale, 02131 MA.

The existing light post, bracket arm, luminaires and appurtenances shall be carefully removed and transported. The cost for any damage done to this equipment, due to carelessness on the part of the Contractor will be back charged to the Contractor.

Forty-eight (48) hours prior to removal, the Contractor shall contact the Street Lighting Division at 617-635-7576 to arrange for the delivery to the Canterbury Street Facility.

METHOD OF MEASUREMENT

Street Lighting Post and Luminaire Remove and Transport will be measured for payment by each unit removed and transported.

BASIS OF PAYMENT

Street Lighting Post and Luminaire Remove and Transport will be paid for at the Contract unit price for each unit removed and transported, which price shall include all labor, materials, equipment and incidental costs required to complete the work. No separate payment will be made for the loading, transportation and unloading of lighting posts, bracket arms, luminaires and appurtenances, but all costs in connection therewith shall be included in the Contract unit price bid.