618 STREET LIGHTING

618.01 DESCRIPTION. Street lighting work shall consist of furnishing all labor, equipment and materials and installing all electrical equipment, conduits, manholes, pull boxes, wiring, luminaires, fixtures, streetlight poles, and incidentals as shown in the contract documents, and as specified herein for a complete working streetlight system.

Wherever the word "provide" is used, it shall mean "furnish and install complete in place and ready for use."

Definitions of electrical terms used in roadway lighting shall be in accordance with Appendix F of the American National Standard Practice for Roadway Lighting ANSI D12.1. Exceptions are as follows:

1. A luminaire shall include direct appurtenances such as a reflector, refractor, housing and supports that are integral with the housing, and high intensity discharge (HID) ballasts.
2. A light pole, also called a lighting standard, shall be considered to include anchor or transformer base, shaft, bracket arm if required, pole cable, and integral hardware to support luminaires.

Items for streetlight equipment shall consist of products of the same manufacturer, as far as practicable. The streetlight system shall conform as to voltage, amperage, frequency, and type specified.

In order to provide the proposed lighting system the Contractor shall cooperate with PEPCO. PEPCO will supply the power required for the locations outlined in the contract documents.

618.02 CODES AND STANDARDS

Material, equipment and installation shall conform to the following:

American Society for Testing and Materials (ASTM)

American National Standards Institute (ANSI)

Certified Ballast Manufacturers

Institute of Electrical and Electronic Engineers (IEEE)

Insulated Power Cable Engineers Association (IPCEA)

National Electrical Code (NEC)

National Electrical Manufacturers Association (NEMA)

Underwriters Laboratories, Inc. (UL)

District of Columbia Electrical Code

National Electric Safety Code

United States of America Standards Institute (USASI)

Rules and Regulations of the Potomac Electric Power Company (PEPCO)

American Association of State Highway and Transportation Officials (AASHTO)

Electrical contractors must be bonded in the District and their electricians must have District licenses. The Contractor must secure a permit approved by the Electrical Engineer, D.C., prior to the beginning of any work, and the street lighting work must at all times be inspected by electrical inspectors of the Department of Transportation (DDOT).

No work shall be covered or enclosed at any time prior to inspection.

The Contractor must have approved shop drawings, catalog cuts, and specifications available at the jobsite for inspection by the Chief Engineer and the Department's electrical inspector.

618.03 MATERIALS

(A) GENERAL. New first quality materials shall be furnished in conformance with 820. Material and equipment must be UL listed and labeled. All electrical parts, wire, and other elements of the streetlight installations shall be of ample capacity to carry required current without excessive heating or causing an excessive drop in potential. Except as otherwise provided herein, each individual item of streetlight equipment shall bear a nameplate or other type of indelible marking or brand that shall identify it as to type, catalog number, and manufacturer. This applies to hardware and miscellaneous materials.

(B) COORDINATION WITH OTHER TRADES. It shall be the responsibility of the Contractor to coordinate the location of equipment, conduit, devices, fixtures, etc., furnished and installed under other sections and by other trades to the extent that interference among such items is avoided. Relocation of items required as a result of failure of the Contractor to coordinate his work with the work of other trades shall be at the expense of the Contractor and at no additional cost to the District.

(C) STANDARD PRODUCTS. Unless otherwise indicated, materials furnished shall be standard products of a manufacturer regularly engaged in the production of such equipment and shall be the manufacturer's latest standard design complying with the specification requirements.

Where materials, equipment, apparatus, or other products are specified by manufacturer, brand name, type, or catalog number, such designation is to establish standards of desired quality and style and shall be the basis of the bid. Specified materials shall be furnished unless changed by mutual agreement between the Contractor and the Chief Engineer. Where two or more designations are listed, the choice shall be optional with the Contractor.

Should the Contractor propose to furnish materials and equipment other than those specified, as permitted by the "or approved equivalent" clauses, he shall submit a written request for any or all substitutions to the Chief Engineer and must demonstrate that the equivalent product being submitted is equal to or exceeds all technical performance and visual criteria of the original specified item. Where such substitutions alter the design or space requirements indicated in the contract documents, the Contractor shall include in

his request all items of cost for the revised design and construction including cost of all allied trades involved.

Acceptance of the proposed substitutions shall be subject to approval of the Chief Engineer. If requested by the Chief Engineer, the Contractor shall submit for inspection samples of both the specified and the proposed substitute items.

In all cases where substitutions are permitted, the Contractor shall bear any extra cost of evaluating the quality of the materials and equipment to be installed.

(D) **SAMPLES.** When samples are required they shall be submitted to the Chief Engineer for approval within 8 weeks after award of contract or prior to start of work, properly marked for identification and free of expense to the District. The District reserves the right to mutilate or destroy any sample submitted when considered necessary for testing purposes. Samples not so mutilated or destroyed will be returned to the Contractor at his expense when no longer necessary for the performance of the contract.

The Contractor shall submit the following:

(1) The name and manufacturer of the equipment he proposes to furnish.

(2) Such data and descriptive materials as may be necessary for the mechanical trades in connection with maintenance.

(3) All wiring or necessary diagrams and drawings for approval.

(4) Any additional samples if deemed necessary.

(E) **MATERIAL AND WORKMANSHIP.** Installation work shall be in accordance with the contract documents. Defective equipment or equipment damaged in the course of installation or test shall be replaced or repaired by the Contractor in a manner meeting the approval of the District without additional compensation.

The contract drawings indicate the extent and general arrangement of the conduit and wiring systems. If departures from the contract drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore, shall be submitted as soon as possible to the District for approval. No departures shall be made without prior written approval.

The Contractor shall be responsible for all cutting and patching necessary for accomplishing the work. All such modified areas shall be left in as good repair as prior to the beginning of this work, at the expense of the Contractor and at no additional cost to the District. Cutting of structural members shall not be done without approval of the Chief Engineer.

Materials and items of work shall be as specified in 820 and in the contract documents.

(F) **GUARANTY.** The Contractor shall guarantee all electrical work to be in accordance with contract requirements and free from defective or inferior materials, equipment, and workmanship for a period of 1 year from date of acceptance of the streetlight work.

If, within the guaranty period, the Department finds that guaranteed work needs to be repaired or changed because of the use of materials, equipment, or workmanship which are inferior, defective or not in accordance with the terms of the contract, DDOT shall so

inform the Contractor in writing and the Contractor shall promptly and without additional expense to the District: (1) Place in a satisfactory condition all such guaranteed work; (2) Make good all damage to equipment, the site, the structure, and/or related appurtenances, which is the result of such unsatisfactory guaranteed work; (3) Make good any work, materials, and equipment that are disturbed in fulfilling the guarantee.

Should the Contractor fail to proceed promptly in accordance with the guarantee, the District may cause such work to be done and the Contractor and the surety or sureties under the bond shall be jointly and severally liable for the cost of same.

618.04 CONTRACT PLANS AND MANUFACTURER'S DRAWINGS

(A) STREETLIGHT PLANS. The contract documents indicate the general arrangements of the streetlight circuits and conduits and the locations of poles and manholes. The contract documents are intended to show and describe the work entirely. However, every item necessary to complete the work may not be specifically shown or described. Incidentals not shown or specified, but necessary for the proper operation of the streetlight system shall be included in the work. The Contractor shall be responsible for furnishing all materials for the installation, complete, so as to insure the successful operation of the streetlight system.

(B) MANUFACTURER'S DRAWINGS. Manufacturer's drawings shall consist of all shop and installation drawings, catalogs, photometric curves, performance data, pole installation details, etc. The Contractor shall secure and/or prepare these drawings and submit them as required by 105.02 before purchasing materials or proceeding with construction. Shop drawings shall show complete details of construction for all portions of the work included. The Contractor shall check each drawing to insure conformance with the contract plans and specifications, and each drawing shall bear the Contractor's signature and certification. Drawings and data not clearly identified will be returned without approval to the Contractor.

Transmittals accompanying all shop drawings shall contain names and addresses of the Contractor, subcontractors, and suppliers. Project title, reference to prior actions on submissions and specification reference shall also be indicated.

618.05 INSTALL ELECTRICAL MANHOLE

(A) DESCRIPTION. The work consists of providing precast concrete or cast-in-place manhole and cast iron frame and cover to provide access to electrical conduit as shown in the contract documents. The Contractor shall furnish all labor, tools, material and equipment necessary for excavation, shoring, de-watering, steel plating (necessary steel plating of the roadway for moving traffic as directed by the Chief Engineer), installation of pre-cast or cast in place manholes, back filling, compaction of fill, temporary patch and maintenance of the cuts until the permanent repairs are made as directed by the Chief Engineer.

The Contractor will verify the exact locations of manholes in the field. Construct the manhole with concrete meeting the specifications of 817.03 for Class B. Before installing the manhole, a 6 inch layer of crushed stone or washed gravel shall be installed, leveled

and compacted and covered with tar paper; after installation the paper shall be removed from the drain hole.

Construct cast-in-place manhole with forms, complete with centering cores and molds, to conform to shape, form, line, and grade required and maintain sufficiently rigid to prevent deformation under load. Make all joints leak-proof and arrange horizontally or vertically. Place forms on successive units for continuous surfaces and fit to accurate alignment, assuring a smooth completed surface, free form irregularities.

All reinforcing bars installed within the manhole structure shall be bonded together. All concrete shall be 4500 psi (28-day strength) mix. The concrete shall be vibrated so there shall be no voids or honeycombing. A pulling-in iron shall be installed opposite of each conduit entrance; cable racks shall be installed as directed by the Chief Engineer.

Provide a 2 inch diameter hole at one corner in the floor of the manhole centered 6 inches off each wall and drive a ¾-inch by 10-ft long copper-clad steel ground rod into earth as indicated in the standard drawings. In pre-cast manholes, the hole shall be provided as a knock-out or pre-drilled. Field drilling of the pre-cast manhole will not be allowed. Extend ground rod approximately 6 inches above finished manhole floor. After completion of manhole provide a ground loop of bare copper ground wire (No. 6 minimum or another size as specified in the contract documents) within manhole and bond to the ground rod by an exothermic weld.

Connect all conduit grounding bushings, cable supports, other metallic parts, splices, neutral wire and ground wire run with each feeder to ground loop. Reinforcing bars shall be of the size and configuration as specified in the standard drawings for the size of the manhole to be installed. Frame and cover shall be heavy-duty gray cast iron and conform to the details of the standard drawings, and conform to AASHTO M105 and M306. The word "**DCSL-TS"** in 1 inch letters is to be cast in the depression shown in the center of the top of the cover and to be flush with the surface of cover.

Manufacturers logo shall not appear on top of either frame or cover. The manhole frames shall be set to the required grade, in full bed of concrete mortar to make watertight connection. Unless otherwise indicated, install tops of manhole covers in unpaved areas approximately ½ inch above finished grade, and in paved areas install flush with finished surface of paving. All adjustment to the grade shall be made using a poured concrete collar. Brick shall not be used to make the final grade adjustment.

(**B**) **MEASURE AND PAYMENT.** The unit of measure of electrical manhole with frame and cover will be per each. Payment will be made at the contract unit price per each for install electrical manhole. Payment will include all labor, tools, materials, equipment, excavate, shoring, de-watering, manhole complete with all racks and pulling-in iron frame and cover, back filling, compaction of backfill, temporary patching, maintenance of the cut until the permanent repairs are made, an all incidentals necessary to complete the work specified herein.

618.06 REMOVE ELECTRICAL MANHOLE

(A) DESCRIPTION. The Contractor shall furnish all labor, materials and equipment necessary to remove existing manhole as shown in the contract documents or as directed

by the Chief Engineer. The Contractor shall remove the frame, cover, and manhole roof, walls and floor. All electrical conduits shall be sealed with cement before backfilling. The excavation shall be backfilled in 6-inch layers and compacted. Backfill material shall consist of suitable soils or granular material. Before removing manholes, the Contractor shall remove all streetlight conductors from other manholes. Refer to following procedures for removal of conductors.

Locate all underground conductors from another D.C. manhole or PEPCO manhole.

Disconnect power from PEPCO power source before removal of conductors.

Remove all underground light conductors from other D.C. manholes or PEPCO manholes.

The Contractor is responsible for notifying PEPCO to disconnect the existing service when removing the existing equipment, and re-establish the service when the new equipment has been installed. Coordination with PEPCO will be the responsibility of the Contractor. All material removed shall become the property of the Contractor and be disposed of off-site at no additional cost to the District. The manhole frame and cover shall be returned to the District when directed by the Chief Engineer. Included within this pay item is the temporary patching of the pavement area where the manhole was removed and maintenance of the patch until final repairs have been made.

(B) **MEASURE AND PAYMENT**. The unit of measure for remove electric manhole will be for each manhole removed. Payment will be made at the contract unit price per each manhole removed, temporary patching, maintenance of the cut until the permanent repairs are made and payment will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work as specified herein.

618.07 INSTALL FRAME AND COVER FOR MANHOLE

(A) **DESCRIPTION**. Work consists of providing and installing new manhole frames and covers for existing D.C. manholes. The frame and cover shall be heavy-duty gray cast iron and conform to the details of the standard drawings, and to AASHTO M105 and M306. The word "**DCSL-TS"** in 1 inch letters is to be cast in the depression shown in the center of the top of the cover and to be flush with the surface of cover. Manufacturers logo shall not appear on top of either frame or cover. The manhole frames shall be set to the required grade, in full bed of concrete mortar to make watertight connection.

Unless otherwise indicated, install tops of manhole covers in unpaved areas approximately ½ inch above finished grade, and in paved areas install flush with finished surface of paving. All adjustment to the grade shall be made using a poured concrete collar. Brick shall not be used to make the final grade adjustment.

The new manhole frame shall be grounded to the manhole ground rod by approved methods.

The work also includes the removal of the frames and covers from the existing manholes as indicated in the contract documents.

(B) **MEASURE AND PAYMENT**. The unit of measure for install electrical manhole frame and cover to existing electrical manhole will be each. Payment for install frame and cover

will be made at the contract unit price per each. The payment will include providing and installing the new frame and cover, adjusting frame and cover to new grade, and removal of the existing frame and cover, all labor, equipment, tools, materials and incidentals necessary to complete the work as specified herein.

618.08 CLEANING ELECTRICAL MANHOLE

(A) DESCRIPTION. The work consists of the removal of all water, dust, and debris from existing manholes. Prior to the removal, the Contractor, using appropriate test procedures, shall determine the existence of hazardous waste within the manhole.

A positive test result for hazardous waste will require the Contractor to remove the hazardous wastes using approved appropriate procedures. The removal of the hazardous waste material will be as specified in Section 618.09.

(B) MEASURE AND PAYMENT. The unit of measure for cleaning electric manholes will be each. Payment for cleaning electric manholes will be made at the contract unit price per each. The payment will include all labor, equipment, tools, materials and incidentals necessary to complete the work as specified herein.

618.09 REMOVE HAZARDOUS WASTE MATERIALS FROM MANHOLE

(A) DESCRIPTION. Work consists of the removal of all hazardous wastes from the existing manholes using appropriate procedures. The Contractor shall submit the hazardous waste removal procedures to the Chief Engineer for approval and shall have the approval prior to proceeding with the hazardous waste removal

(B) MEASURE AND PAYMENT. The unit of measure for Remove Hazardous Waste Materials From Manhole will be each. Payment will be made at the contract unit price per each manhole actually cleaned of hazardous wastes. The payment will include all labor, equipment, tools, materials and incidentals necessary to remove the hazardous waste from the manholes and from the job site to an approved hazardous waste facility, and complete the work as specified herein.

618.10 REPAIR ELECTRICAL MANHOLE

(A) DESCRIPTION. The work consists of repairing existing District (D.C.) manholes after the manholes have been cleaned according to sections 618.08 and 618.09. The Contractor shall proceed with the repair work as follows.

1. Identify all damage in DC electrical manhole. Repair all damages in the manhole with non-shrink grout as specified in Section 703.

2. Remove existing conductors between manhole and other manholes and/or streetlights connected to the conductors designated by the Chief Engineer. Patch conduit holes in DC or PEPCO manholes. The existing conduits that contained the removed conductors shall be abandoned between manholes and between manholes and streetlights. The abandoned conduit ends shall be cut flush with the inside face of the manhole wall.

3. The abandoned conduit shall be filled with non-shrink grout meeting the requirements of Section 703 to a depth of 6 inches from the inside face of the manhole, and finished clean smooth with the inside wall of the manhole.

The Contractor shall be responsible for notifying PEPCO to disconnect the existing service prior to the removal of the existing equipment, and re-connection of the service after the new equipment has been installed. Coordination and scheduling with PEPCO shall be the responsibility of the Contractor.

(B) **MEASURE AND PAYMENT**. The unit of measure for repair electric manholes will be each. Payment for repair electric manhole will be made at the contract unit price per each. The payment will include all labor, equipment, tools, materials and incidentals necessary to complete the work as specified herein.

618.11 ELECTRICAL JUNCTION BOX

(A) **DESCRIPTION.** Work consists of providing pre-cast junction boxes to provide access to electrical conduit as shown in the contract documents. The Contractor shall furnish all labor, tools, material and equipment necessary for excavation, shoring, de-watering, installation of junction boxes, back filling, compaction of fill, temporary patch and maintenance of the cuts until the permanent repairs are made. Steel plates may be required as directed by the Chief Engineer and will be paid as specified in Section 624.

The Contractor will verify the exact locations of junction boxes in the field and install per manufacturer's instructions.

In the 2 inch hole provided in the floor of the junction box, drive a ¾-inch by 10-ft long copper-clad steel ground rod into earth as indicated in the contract documents. Extend ground rod approximately 6 inches above junction box floor. After completion of junction box, provide a ground loop of bare copper ground wire (No. 6 minimum or another size as specified in the contract documents) within junction box and bond to the ground rod by an exothermic weld. Connect all conduit grounding bushings, cable supports, other metallic parts, splices, neutral wire and ground wire run with each feeder to ground loop.

The junction boxes shall conform to details indicated in the standard drawings. The word "DCSL-TS" in 1 inch letters is to be cast in the depression shown in the center of the top of the cover and to be flush with the surface of cover. Manufacturers' logo shall not appear on top of either frame or cover.

The junction box shall be set to the required grade. Provide a temporary patch around the junction box and maintain the patch until permanent repairs are made.

(B) **MEASURE AND PAYMENT.** The unit of measure for Electrical Junction Box will be each. Payment for Electrical Junction Box will be made at the contract unit price per each. The payment will include temporary patching and maintenance of the patch, and all labor, equipment, tools, materials and incidentals necessary to complete the work as specified herein.

618.12 INSTALL ELECTRICAL CONDUITS (CONCRETE ENCASED)

(A) DESCRIPTION. Work consists of providing PVC conduit in the sizes and duct bank configurations shown in the contract documents. The conduit shall be encased in PCC dry pack meeting the requirements of Section 817.03 for Class F, 3500 psi concrete. The work also consists of the excavation, shoring, backfilling, and trench backfill compaction. Steel plating may be required and will be paid according to the requirements of 616.19.

The Contractor shall excavate the trench at the locations indicated in the contract drawings. The trench excavation and shoring shall be in accordance with 207.

Conduit(s) shall be PVC schedule 40 and the size and duct bank configuration specified in the contract documents, and shall be installed to proper line and grade. The trench shall be opened progressively between manholes or between manholes and the proposed streetlights, with simultaneously installation of conduit(s). Conduit(s) shall be installed with a minimum of 36 inches of cover in roadways and 24 inches in all other locations, and shall be installed in dry trenches. The conduit shall be installed in full lengths using manufactures' supplied bends and couplings. When the Contractor must make field cuts, the conduit ends shall be reamed to remove any rough edges before joining together. The joints shall be cleaned, cemented and the lengths of the conduits coupled tightly.

Where two or more conduits are being installed in the same trench, the Contractor shall use approved conduit spacers for the size and configuration of the conduit runs. Conduit(s) shall be installed to slope toward manhole. The slope of duct bank runs shall be at least 10 inches per 300 ft. All conduit runs shall be complete and points of penetration of the wall of the manholes shall be sealed before any dry mix concrete encasement is installed. The wall penetration of PEPCO manholes will be done under the supervision and direction of PEPCO field personnel. The penetration of DC manholes will be done under the supervision and direction of the District personnel. At the end of each workday, the Contractor shall seal the ends of all conduits to prevent the entrance of dirt and water into the conduit system.

The Contractor shall provide 4" detectable magnetic plastic warning tapes 12" above the top of the concrete encasement of the duct banks as shown in the contract drawings. The warning tape shall be detectable by means of sensors in use to detect buried cable and conduit. The color of warning tape shall be yellow. The warning on the tape will be "**CAUTION, BURIED ELECTRICAL LINE BELOW".**

The backfilling of the trench shall be in accordance of the provisions of 207.04.

New conduit may be spliced or added to existing conduit as a part of this work. The splice shall be accomplished with couplings approved for the size of the conduits. The Contractor shall locate all underground utilities and underground structures prior to trenching.

(B) MEASURE AND PAYMENT. The unit of measure for Install Electrical Conduit (Concrete Encased) will be per linear foot of conduit or duct bank of conduits installed. Payment will be made at the contract unit price per linear foot. The payment will include all labor, tools, materials, equipment, excavation, shoring, de-watering, concrete encasement, penetration of manholes (District-owned), back filling, compaction of fill, temporary patching, maintenance of the cut until the permanent repairs are made, and all

incidentals necessary to complete the work specified herein. Steel plating shall be paid for according to 616.19.

618.13 INSTALL ELECTRICAL CONDUITS (BORED)

(A) DESCRIPTION. The work consists of the installation of conduit by the method of directional boring. The Contractor shall furnish all labor, tools, material and equipment necessary for directional boring, also referred to as Horizontal Directional Drilling (HDD) to install conduit at the locations shown in the contract documents. All conduit placed under existing pavement shall be installed with no disturbance to the existing roadway. Any damage to the existing pavement shall be repaired at the direction of the Chief Engineer at no cost to the District.

(B) CONSTRUCTION REQUIREMENTS. The Contractor shall drill to pull in the conduits in the size specified in the plans Conduit(s) shall be PVC schedule 80 meeting the requirements of ASTM F789 and shall be installed to proper line and grade. Conduit(s) shall be installed with a minimum of 36 inches of cover in roadways and 24 inches in all other locations. The conduit shall be installed in full lengths using manufactures' supplied bends and couplings.

Conduit(s) shall be installed to slope toward manhole. The slope of duct bank runs shall be at least 10 inches per 300 ft. All conduit runs shall be complete and points of penetration of the wall of the manholes shall be sealed before any dry mix concrete encasement is installed. The wall penetration of PEPCO manholes will be done under the supervision and direction of PEPCO field personnel. The penetration of DC manholes will be done under the supervision and direction of the District personnel. At the end of each workday, the Contractor shall seal the ends of all conduits to prevent the entrance of dirt and water into the conduit system.

The Contractor shall locate any and all underground utilities and tunnels before trenching. Several locations in the District may have abandoned street-car tracks, covered with pavement. The Contractor shall verify and locate before trenching by means of test pits.

(C) MEASURE AND PAYMENT. The unit of measure for Install Electrical Conduits (Bored) will be per linear foot of conduit or duct of conduits installed by boring. Payment will be made at the contract unit price per linear foot. The payment will include all labor, tools, materials, equipment, excavation, boring, penetration of manholes (both D.C.'s & PEPCO's), and all incidentals necessary to complete the work specified herein.

618.14 ROD AND CLEAN DISTRICT-OWNED CONDUIT

(A) GENERAL. Work consists of providing all labor, equipment and materials necessary to rod and clean and prove the integrity of the existing electrical conduit between the manholes or between manholes and existing streetlight or traffic signal poles as required. If the conduit is found to be blocked, collapsed or have a breakdown during the rod-clean phase, the location must be determined and marked so the repair can be made to the duct under 618.15. All material removed from the conduit as part of the cleaning operation shall be disposed of by the Contractor off site at no additional cost to the District.

(B) MEASURE AND PAYMENT. The unit of measure for Rod and Clean District Owned Conduit will be the linear foot. Payment will be made at the contract unit price per linear foot. The payment will include all labor, tools, material, equipment needed to rod and clean the existing conduit and all incidentals necessary to complete the work specified herein.

618.15 REPAIR EXISTING DISTRICT-OWNED CONDUIT

(A) GENERAL. The work consists of repairing blocked, collapsed or a break-down in existing conduit discovered during the duct rod and clean phase, between the manholes or between manholes and existing streetlight or traffic signal poles.

(B) CONSTRUCTION REQUIREMENTS. The Contractor shall excavate, shore and de-water the trench as necessary to expose the affected conduit. The Contractor shall make the repairs as needed to existing conduit and install concrete encasement around the repaired duct. Back filling, compaction of the fill, temporary patching and maintenance of the cuts until the permanent repairs are made shall be performed as directed by the Chief Engineer.

(C) MEASURE AND PAYMENT. The unit of measure for Repair Existing District Owned Conduit will be the linear foot. Payment will be made at the contract unit price per linear foot of conduit. The payment will include all labor, tools, materials, equipment, excavation, concrete encasement, back fill, compaction of the fill, temporary patch of surface, maintenance of the cut until the permanent repairs are made and all incidentals necessary to complete the work specified herein.

618.16 INSTALL ADDITIONAL CONDUIT AND SWEEP BENDS IN POLE FOUNDATION

(A) DESCRIPTION. The work consists of furnishing and installing additional conduits and sweep bends in pole foundations that will be necessary only in case of existing lead feeder cables. This is beyond the 1 conduit and sweep bend necessary for all foundation installation.

The Contractor shall furnish and install, and provide caps for up to 2 (two) additional conduit stubs (one to street, one to the sidewalk), each with a sweep bend, in pole foundation whenever there is a lead cable or as directed by the Chief Engineer.

Conduit(s) shall be PVC schedule 40 and the sweep bends shall be 24” radius.

(B) MEASURE AND PAYMENT. The unit of measure for Install Additional Conduit and Sweep Bends in Pole Foundation will be per each. Payment will be made at the contract unit price per linear foot of conduit and sweep bends. The payment will include all labor, equipment, tools, materials and incidentals necessary to complete the work as specified herein.

618.17 PROBE-DISCOVER FAULTS IN THE STREETLIGHTING CABLE/CONDUIT SYSTEM

(A) GENERAL The Contractor shall probe-discovery faults in Street lighting cable/conduit system, as shown in the contract documents or upon notification by the DDOT Street

Light Branch, of a cable/conduit failure. Work shall proceed at each designated location, as follows:

1. DC Street Light Branch will provide the Contractor the access to the cable/conduit plats or GIS printout for each location that show the locations of the feeds between the PEPCO manholes, DC manholes or lights that are out. The plats/printouts are not guaranteed to be 100% accurate and the Contractor must verify field conditions.

2. The Contractor shall determine if the feeder cable is direct-buried cable(s) installed in conduit, if the conduit system is blocked, broken down, gas pipe or a partial conduit system between the light pole and its feed source, and shall probe to locate and determine the problem using appropriate tools and testing equipment.

3. If the problem is determined to be defective cable in the conduit or manhole, the Contractor shall proceed with the repair work under the appropriate pay items in this contract as directed by the Chief Engineer.

4. If the problem is with the conduit system or direct burial cable, the Contractor shall proceed with the work under Pay Item, Developing Repair Procedures of Faults in the Street Lighting Cable/Conduit System.

(B) MEASURE AND PAYMENT. The unit of measurement Probe-Discover Faults in the Streetlighting Cable/Conduit System will be per each location as directed by the Chief Engineer. Payment will be made for each location for all labor and equipment necessary to complete the work specified herein.

618.18 DEVELOP REPAIR PROCEDURES FOR FAULTS IN THE STREETLIGHTING CABLE/CONDUIT SYSTEM

(A) GENERAL. The Contractor shall, after the Probe-Discovery phase has been completed and if required, meet with the staff of the Streetlight Branch at each designated location to determine how the permanent repairs will be made to the fault. The work shall be as follows:

1. Coordinate a meeting with the Streetlight Branch staff on location or in their office to determine the course of action to correct the fault.

2. Bring field notes or show findings from the Probe-Discovery Phase.

3. Set out the procedures on how to correct the fault.

4. Establish which pay items will be needed in the permanent repairs and estimated quantities to complete the repair.

Acquire verbal cut number; prepare permit application and drawings needed to perform the repair work. (Verbal cut number on this contract can be obtained by calling Investigations and Inspection Branch on (202) 645-7050.)

(B) MEASURE AND PAYMENT. The unit of measurement for Develop Repair Procedures for Faults in the Streetlighting Cable/Conduit System will be per each location as directed by the Chief Engineer. Payment will be made for each location for all labor and equipment necessary to complete the work specified herein.

618.19 DRAWINGS-PERMIT APPLICATION FOR REPAIR IN THE STREETLIGHTING SYSTEM

(A) GENERAL. The contract will act as the Public Space Permit to do all work given to the Contractor under this pay item. The drawings will be added to the contract as "AS-BUILD" conditions after the work is complete. The Contractor shall make the necessary permit drawings, showing locations of all cuts, conduit paths, submit drawings for approval to the Street Light Branch and complete the Public Space Permit Application. The Contractor for each designated locations will perform the following work:

Make necessary permit drawings of conduit runs, ensuring that all dimensions between the conduit and the face of the curbs are on the drawings.

1. Verbal cut numbers and all cuts are shown on the drawings with dimensions from the face of the curbs

2. Fill out the Public Space Permit Application for each cut made.

3. Deliver to the drawings to the Street Light Branch for approval and stamping for submission with the Public Space Permit Application.

4. The Public Space Permit Application will be delivered to the Street Light Branch's office for the necessary agent's signature; the Street Light Branch staff will file the permit application.

(B) MEASURE AND PAYMENT. No separate payment will be made. The work is measured and paid for under Pay Item Develop Repair Procedures for Faults in the Street Lighting Cable/Conduit System.

618.20 INSTALL UNDERGROUND STREETLIGHT CABLES

(A) GENERAL. The work consists of furnishing all labor, materials and equipment necessary to install current carrying conductors, as specified in the contract document. The conductors will be installed in, but not be limited to, manholes, existing conduit, new conduit, transformer bases and poles.

(B) CONSTRUCTION REQUIREMENTS. All cables shall be installed in continuous lengths and without splices between termination points. The Contractor shall provide adequate and proper equipment for the pulling in of the cables. The Contractor shall pull the cables through conduits without over-stressing, scoring or cutting the wire and without damaging the insulation or outer covering.

Where strain on the cables is likely to be excessive, the Contractor shall use an approved cable lubricant meeting the requirements of cable supplier. Where more than one cable is to occupy the same conduit, the cables shall be installed at the same time.

If the Contractor is not making the final splices or terminal connections immediately after installation, the cable ends shall be sealed to prevent moisture intrusion. The Contractor shall install sufficient slack cable in each manhole to allow for racking. Each phase conductor and neutral shall be identified using standard color markings as indicated in 820.11.

All cables located in utility company (i.e., PEPCO) manholes shall be tagged to show ownership, circuit number and voltage. Cables in District-owned manholes shall be tagged to indicate phase. After cables have been spliced, racked, and prior to final service connection by the utility company, the Contractor shall give each phase conductor and neutral an insulation resistance test between the conductors and ground. The test shall be performed in the presence of the Chief Engineer.

The Contractor shall furnish all labor, materials and test equipment. The test equipment shall be calibrated and certified yearly by a testing laboratory or the equipment manufacturer. Copies of the certification shall be supplied to the Chief Engineer.

Each conductor shall indicate a value of not less than fifteen (15) mega ohms. If a fault exists, the Contractor shall locate the faulty cable section, and furnish and install a new cable. If it is determined that the fault is due to a splice, the decision to repair the splice or to replace the faulty cable section shall be determined by the Chief Engineer.

The Contractor is responsible for notifying PEPCO to reestablish the service when the new equipment has been installed. Coordination with PEPCO will be the responsibility of the Contractor.

(C) MATERIALS.

1. Cable – as per Section 820.11

2. Splices – as per Section 621.12

3. Circuit identification – as per Section 820.11

(D) MEASURE AND PAYMENT. The unit of measure for Install Underground Streetlight Cables will be per linear foot complete in place. Payment will be made at the contract unit price per linear foot of cable. The payment for installation will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work specified herein.

618.21 INSTALL OVERHEAD CABLES

(A) GENERAL. The work consists of providing overhead cables of the size specified in the contract documents to provide service to streetlights mounted on wood poles. The streetlights are normally mounted on district owned wood poles, but the installation may be on wood poles owned by other utilities.

(B) CONSTRUCTION REQUIREMENTS. The Contractor shall install the overhead cable using approved connection hardware and approved equipment. The Contractor shall ensure that the cable is not damaged during installation. The cable shall be installed according to the cable manufacturer's specifications. The cable shall be installed with proper tension and sag according to the temperature on the day installed. All damaged cables will be removed from the site and replaced at no additional cost to the District.

The overhead cable shall be a certified neutral supported cable of the size specified in the contract documents.

Tree branches or tree limbs that prevent the installation or are within the cable clearance area shall be pruned or removed at the direction of the Chief Engineer. Qualified line

clearance tree trimmers will perform all pruning work. Tree branches, tree limbs and any other debris generated shall be removed from the project site and properly disposed of as a part of this work.

(C) MEASURE AND PAYMENT. The unit of measure for Install Overhead Cables will be per linear foot. Payment will be made at the contract unit price per linear foot of cable. The payment for installation will include all labor, equipment, tools, materials (including approved hardware for connections), and all incidentals (including splices) necessary to complete the work specified herein

618.22 INSTALL COPPER GROUND WIRE

(A) GENERAL. The work consists of providing copper ground wire in conjunction with current carrying conductors as indicated in the contract documents. The installation of copper ground wire may include the replacement of existing damaged copper ground wire as directed by the Chief Engineer.

(B) CONSTRUCTION REQUIREMENTS. The Contractor shall install the ground wire in continuous lengths. All connections in manholes shall be made using exothermic welds with two coats of insulating varnish applied over welds and the ground wire within 1 foot of the weld. All connections to foundation ground rods shall be made with approved connectors. Grounding conductors shall be sized according to Section 250, National Electrical Code. The ground wire shall be installed simultaneously with current carrying conductors. The Contractor shall ensure that the ground wire is not damaged or kinked during installation. All damaged wire shall be removed and replaced at no additional cost to the District. The grounding system shall be installed, connected and tested before energizing the current carrying conductors.

(C) MEASURE AND PAYMENT. The unit of measure for Install Copper Ground Wire will be per linear foot. Payment will be made at the contract unit price per linear foot of cable complete in place. The payment for installation will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work specified herein.

618.23 REMOVE UNDERGROUND CABLE

(A) GENERAL. The work consists of the removal and disposal of underground District owned cables, conductors and ground wire, as indicated in the contract documents, or as directed by the Chief Engineer. The work includes cable in ducts and direct buried cables.

(B) REMOVAL PROCEDURES. The Contractor shall ensure that when the cable is removed, no remnants of the cables remain in the duct.

The Contactor shall remove the designated underground alley light or streetlight cables between DCSL/TS manholes or PEPCO manholes; between PEPCO manhole and DCSL/TS manhole; or between DCSL/TS manhole and DC manhole, according to following procedures:

1. Locate power source of each alley light or streetlight circuit.

2. Disconnect the power before removal of cables between manholes.

3. Remove all underground cables between manholes or light and manhole.

The Contractor shall be responsible for notifying PEPCO, if PEPCO manholes are a part of this work, to disconnect the existing service when removing the existing cable, and to reestablish the service when the new cable has been installed. All coordination with PEPCO for this work will be the responsibility of the Contractor.

Lead jacketed or lead insulated cables shall be disposed of in the manner prescribed for hazardous waste. The disposal shall meet District and Federal environmental regulations. The area around each manhole entrance shall also be cleaned of all hazardous waste and debris before the Contractor leaves the site. The Contractor will dispose of all debris and hazardous waste generated as part of the work at no additional cost to the District.

In ducts or trenches where more than one cable is to be removed, the Contractor shall be paid for the linear foot of one (1) cable, not all removed cable.

(C) MEASURE AND PAYMENT. The unit of measure for Remove Underground Cable will be per linear foot**.** Payment will be made at the contract unit price per linear foot of cable. When multiple cables are to be removed from a single duct, all removed cables will be considered as one (1) cable for payment. The payment will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work specified herein.

618.24 REMOVE EXPOSED RACEWAY ON WOOD POLE

(A) DESCRIPTION. The Contractor shall identify wood poles or investigate wood poles as identified in the contract documents with raceways that protect alley light conductors from manholes. Remove raceways after removal of existing feeders as per 618.23.

(B) MEASURE AND PAYMENT. The unit of measure for Remove Exposed Raceway on Wood Pole will be made at the contract unit price per each raceway removed. Payment will be made at the contract unit price per each raceway. The payment will include all labor, equipment, tools, materials and incidentals necessary to complete the work as specified herein.

618.25 INSTALL FOUNDATION FOR STREETLIGHT POLES

(A) DESCRIPTION. The work consists of furnishing and installing streetlight pole foundations at the locations specified in the contract documents. The Contractor shall install the number and size of the conduits and sweep bends in the foundations specified in the contract documents as part of this work.

(B) CONSTRUCTION REQUIREMENTS. The foundation shall be cast in place at the locations specified in the contract documents and centerline of the foundation will be located 36 inches from the face of the curb unless otherwise indicated in the contract documents. The foundation shall not be installed at locations where the minimum clear area on a sidewalk will be less than 36 inches. A one (1) inch conduit shall be installed through the foundation for the installation of a ground rod. The ground rod and connection shall be included in the as a part of this work.

The Contractor shall be responsible for ensuring that all reinforcing steel, anchor bolts, ground rods, conduit and other appurtenances are properly located before concrete is poured. The anchor bolts shall be set to the bolt circle specified in the contract documents

and shall project 3" above the top of foundation. Where existing conduit is reused it shall be connected with new PVC conduit going into the new foundation using approved electrical couplings. The conduit for the electrical conductors shall be set as close to the center of the foundation as possible. All foundation caps shall be set one inch above grade. The foundation shall be allowed to set for a minimum of 72 hours before installation of the pole.

The Contractor shall be responsible for the disposal off site of all excavated earth and debris resulting from this work at no additional cost to the District.

(C) MATERIAL.

1. PCC – Class B, as per 801.01 (A) and (B), AASHTO M85, Type I

2. Conduit – Schedule 40, as per 820.12, FS 1094A

3. Reinforcing steel – as per 812.02, AASHTO M 31, Grade 60

4. Anchor Bolts – as per 822.06, AASHTO M 314

(D) MEASURE AND PAYMENT. The unit of measure for Install Foundation for Streetlight Poles will be per each foundation installed. Payment will be made at the contract unit price per each foundation. The payment for installation will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work specified herein.

618.26 REMOVE STREETLIGHT FOUNDATIONS

(A) GENERAL. The work consists of the removal of streetlight pole foundations as shown in the contract documents. The Contractor shall remove the foundation completely. The Contractor shall cut and seal all conduit that is to remain in place, remove the anchor bolts, reinforcing steel, and the ground wire or rod.

Where the foundation is located within a tree space, the Contractor shall backfill the excavation with approved material to grade. Where the foundation is located in a paved area the contractor shall backfill with approved material to within 6" of grade and then install a temporary asphalt patch meeting the requirements of 407.

(B) MEASURE AND PAYMENT. The unit of measure for Remove Streetlight Foundation will be per each foundation removed. Payment will be made at the contract unit price per each foundation removed. The payment will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work specified herein.

618.27 STREETLIGHT BASE – BREAKAWAY AND STEEL

(A) GENERAL. The work consists of providing Breakaway and Steel Streetlight Bases at locations shown in the contract documents. The bases shall be provided with all necessary factory supplied hardware for the access door, installation, and grounding.

(B) CONSTRUCTION REQUIREMENTS. The Contractor shall install the base on the existing streetlight foundation. The base shall be trued and leveled by means of factory supplied shims. The base shall be grounded to the foundation by means of factory supplied lugs. The Contractor shall set the base with care so as not to damage the finish or cause deformation. All damage to the finish will be repaired and/or replaced at no

additional cost to the District. If the material is damaged during the time between installation and acceptance by the District, the Contractor shall repair and/or replace in kind at no additional cost to the District.

Replace Streetlight Base at Existing Streetlight Pole.

Work includes, but is not limited to, replacing damaged and deteriorated streetlight pole transformer base with a new streetlight base. The Contractor shall disconnect service to the streetlight; temporarily remove the existing streetlight pole; remove the damaged or deteriorated base, install a new streetlight base on the new or existing foundation, and reinstall existing streetlight pole and equipment. The Contractor shall make all necessary splices, and ensure that the streetlight is operational.

(B) MATERIAL.

Breakaway Base – as per 820, ASTM A 356

Steel Base – as per 820, AASHTO M 111M/M

(C) MEASURE AND PAYMENT. The unit of measure will be per each Streetlight Base. Payment will be made at the contract unit price per each Streetlight Base. The payment will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work specified herein.

618.28 INSTALL STREETLIGHT POLE

(A) GENERAL. The Contractor shall provide new streetlight poles and arms as specified in the contract documents. (Transformer base installation for pendant posts shall be covered by a separate item). All accessories including bolts, bolt caps, nuts, washers and clips necessary for installation are included in the work. All equipment that the Contractor receives shall be stored according to manufacturer recommendations. The bases and shafts shall be installed true and level and any required shimming shall be done with factory-supplied shims.

The Contractor shall set the post with care so as not to damage the finish. All damage to the finish will be repaired and/or replaced at no additional cost to the District. The Contractor shall replace any material damaged before the acceptance by DDOT in kind at no additional cost to the District. All debris generated as part of the work will be disposed of by the Contractor at no additional cost to the District.

Feeder cable (#10 stranded wire RHW-2 or as specified in the contract documents) and ground (#8 or as specified in the contract document) cables associated with the pole installation shall be included in this bid item.

When directed by the Chief Engineer, the Contractor shall deliver new poles to DC Warehouse (located at 1735 Fenwick Street, N.E., Washington, DC 20002). The contractor should call 24 hours in advance of delivery of the required material. The delivery time at the warehouse is 8:30-11:30 a.m. and 12:30-2:00 p.m. Monday through Friday.

Pendant Pole with Eight Foot Arm

Work includes provision of steel pendant pole with an eight (8) foot arm, or as specified in the contract documents. Included shall be all electrical wiring, power cable, and ground wires. Materials shall meet the requirements as specified in the contract documents.

No. 16/18/716/Twin-20 Streetlight Pole

Work shall include drilling or slotting newly installed base in order to install the pole on a new 15" bolt circle foundation. The Contractor shall install the pole plumb. If required, shimming shall be done only with manufacturer's supplied shims. The Contractor shall furnish new #16 casing and base doors, as a part of this pay item.

5A Alley Post with 3-foot Arm

Work shall include installation of post by direct embedment in the ground.. The Contractor shall install the post grounding system before installing any power cables. A ¾" x 10' ground rod shall be installed beside the post. The Contractor shall ground the post with a #8 stranded bare copper wire (or as specified in the contract documents) connected to the post grounding lug and to the ground rod with exothermic welds and covered with two coats of insulating varnish. When setting the post the Contractor shall use care so as not the damage the factory applied finish. Damage to the post shall be repaired by the Contractor at no additional cost to the District.

The poles shall not be installed on any property entrances. In case of conflicting dimensions in the contract documents, the Contractor shall notify the Chief Engineer for resolution.

No. 16 Cast Iron Streetlight Pole

Work shall include drilling or slotting the existing base (or newly installed base) in order to install the pole on a new 15" bolt circle foundation. The Contractor shall install the pole plumb. Shimming, if required, shall be done only with manufacturer's supplied shims.

(B) MEASURE AND PAYMENT. The unit of measure for Install Streetlight Pole will be per each furnished and/or installed. Payment will be made at the contract unit price per each pole. The payment for installation will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work specified herein.

618.29 REMOVE STREETLIGHT POLES

(A) GENERAL. The Contractor shall furnish all labor, material and equipment to remove streetlight poles and associated equipment, (including conversion kits, lamps, photo cells, wiring within the poles, street signs and poles) as shown in the contract documents. All poles that are to be reinstalled shall be carefully removed. All parts damaged by the Contractor will be replaced by the Contractor at no additional cost to the District. All posts shall be disassembled and inspected by the Contractor for parts that can be reused at a later time. The Contractor shall supply the District with an inventory of all parts that are removed and re-useable. The Contractor will deliver the re-useable poles or parts to the District's warehouse at 1735 Fenwick Street, N.E., Washington, D.C. All debris,

including broken parts, generated as part of this work, will be disposed of by the Contractor at no additional cost to the District.

If the pole is in good condition and is to be reused in the project, the Contractor shall transport the pole to its own storage site.

Backfill and compact all holes created by removing existing metal light poles except holes that will be used again for new light poles. Backfill materials shall consist of suitable soils or granular material.

All streetlight poles and alley light poles are included in this specification.

For combination poles (traffic signal and streetlights), pre-emption and signal cables shall be disconnected and reconnected by District personnel. The Contractor shall remove, tape, rack and test the pre-emption cable as directed by the Chief Engineer. The pre-emption cable shall be reinstalled with traffic signal cable.

(B) MEASURE AND PAYMENT. The unit of measure for Remove Streetlight Pole will be each. Payment will be made at the contract unit price per each. The payment will include all labor, tools, materials, equipment, dis-assembly of pole parts, inventory of parts removed and reuseable, delivery of parts, stacking in the warehouse and/or pole yard, disposal of broken parts, debris and all incidentals necessary to complete the work specified herein.

618.30 REMOVE STREETLIGHT CONTROL PEDESTAL

(A) GENERAL. The Contractor shall provide for the removal of existing street light control pedestals. The pedestals shall be removed after all series lights (if any) are converted off the circuit and PEPCO has disconnected the pedestals from their system. The pedestal shall be completely removed, the conduits shall be filled with cement, and the excavation shall be backfilled in 6” layers and compacted to match the surroundings. All material removed as part of this work shall become the property of the Contractor and shall be disposed of at no additional cost to the District.

(B) MEASURE AND PAYMENT. The unit of measure for Remove Streetlight Control Pedestal will be each. Payment will be made at the contract unit price per each. The payment will include all labor, tools, materials, equipment, excavation, back fill, compaction of the fill all incidentals necessary to complete the work specified herein.

618.31 CLEAN AND PAINT STREETLIGHT POLES

(A) GENERAL. The work consists of the cleaning and preparation for painting the streetlight poles, painting of the poles and proper disposal of any hazardous waste.

(B) COSTRUCTION REQUIREMENTS. The Contractor shall apply a two-coat paint system as specified herein. The painting of steel and other metal work shall include complete preparation of the metal surfaces, application and protection of the drying paint coatings, removal and proper disposal of existing paint, rust mill scale and hazardous waste, protection of workers and the environment and furnishing all labor, materials, tools, equipment and incidentals necessary for proper execution of the work.

(C) CERTIFICATION

A certified Painting Contractor/Subcontractor shall perform all field painting. All Contractor/Subcontractor personnel working on this item of work shall be qualified and have current certification.

(D) PROTECTION OF WORKERS AND THE ENVIRONMENT

Protection of workers and the environment shall be provided by the Contractor as an integral requirement of the performance of the work. The Contractor shall employ the best current methodology for protection of the worker/employee and submit a plan to the Chief Engineer for approval.

(E) MAINTENANCE AND PROTECTION OF HIGHWAY AND PEDESTRIAN TRAFFIC AND ADJACENT PROPERTY

The Contractor shall be responsible for any disfigurement by splatters, smirches and splashes of paint on vehicular traffic and pedestrians or adjacent property. The Contractor shall also be responsible for damage to the streetlight pole and adjacent property through the use of equipment.

Proper cloths will be required to minimize splatters of paint on concrete surfaces. Any damage or disfigurement shall be replaced or cleaned at the sole expense of the Contractor.

(F) CONDITIONS FOR SURFACE PREPARATION AND PAINT APPLICATION

1. Surface preparation shall not be performed when the surface is below 32 º F, within 5 º F of the dew point or when anticipated weather conditions would preclude application of the primer on the same day.

2. Painting shall not be performed when it is likely that moisture in the form of precipitation, fog or dew on contact surfaces that have not cured to water resistance.

3. All surfaces shall be painted with two coats of iron oxide primer.

4. All surfaces shall then be painted with two (2) finish coats of Duron Duraclad 12 Series, or approved equal, the color to match appropriate Federal Color Chip as directed by the Chief Engineer. Each coat is to be applied separately according to manufacturer's recommendations.

(G) SURFACE PREPARATION

1. Surfaces shall be prepared for repainting by cleaning with a biodegradable graffiti remover and a de-scaling acid compound.

Biodegradable graffiti remover equal to TAGAWAY, manufactured by Equipment Trade Service Co., Inc.

Descaling acid compound equal to COIL SNAKE, manufactured by Equipment Trade Service Co., Inc.

2. The Chief Engineer will be the sole approving authority of the adequacy of the surface preparation.

3. After the prepared surfaces of existing steel have been inspected and accepted, the surfaces shall be primed the same day. Should rust-back occur before primer application, the affected area shall be cleaned at no extra cost to the District.

(H) GENERAL REQUIREMENTS FOR FIELD PAINTING

1. All paint shall be stored, mixed, thinned and applied in accordance with the manufacturer's recommendations. In cases where the manufacturer's recommendations are more lenient than the requirements in this specification, the manufacturer's recommendations shall govern only if specifically authorized by the Chief Engineer.
2. Prior to application of each coat, the surfaces to be painted shall be cleaned as necessary so as to be dry and free of dirt, grease, glue and paper residue and rust. All residue of abrasives, paint and dust remaining after cleaning or other operations shall be removed using a commercial grade vacuum cleaner equipped with a brush type cleaning tool or by double blowing with clean air.
3. All paint shall be mixed using power mixers of a type recommended by the manufacturer. Only complete kits of the iron oxide primer shall be mixed. Iron oxide primer that has exceeded its pot life shall be discarded. Paints shall be frequently mixed during application. Iron oxide primer shall be continuously agitated and shall be applied from containers equipped with a mechanical agitator, which shall be in constant use during application. Paints shall be frequently remixed during application. Paints shall be thinned only with prior approval of the Chief Engineer.
4. Application of paint shall result in a tight film of specified thickness, well bonded to the metal or underlying coatings, including all crevices and corners and shall be free from laps, streaks, sags, bubbles, runs oversprays, dry spray, shadow-through, skips, excessive film build-up, misses and other defects.

(I) REPAIRS

1. All defects or damaged areas shall be repaired at the Contractor's expense. Said areas shall be coated with full system as required in these specifications. Repair may be limited to touch-up of damaged areas but in no way shall the number of coats, the required coating system or the dry film thickness of each coat be modified because of the repair procedure.
2. Defects in the paint film, including damage such as scratches and areas of non-adherent paint and rusting shall be repaired.

(J) PERFORMANCE TESTS AND PRODUCT CERTIFICATION

The following information shall be submitted as a complete package for approval for each coat in the system selected at least 30 days prior to the anticipated beginning of painting operations:

1. A one (1) quart sample of each coat in the system
2. Certification from the manufacturer that the materials supplied for use as field and repair primer and finish coats contains no more than 0.005% lead.

3. Product and material safety data sheets and application guides the proposed system to the Chief Engineer for material approval.

(K) PAINTING SCHEDULE AND CONTRACTOR'S SUBMITTALS

Before any painting operations begin, the Contractor shall submit in writing to the Chief Engineer, as part of the permit application to DCRA, his proposed work schedule, which shall include:

1. A system procedure or plan for all cleaning and painting operations.

2. The type and method of protection against paint splatters, spray, drippings and other disfiguring elements while cleaning and painting over roadways, pedestrian/bicycle paths and areas in the vicinity of private property.

(L) INSPECTION

1. Authorized personnel representing the District shall inspect all work. As each operation (cleaning, spot painting and each coat of painting) is completed and prior to any succeeding operation, the Contractor shall notify the Chief Engineer for approval before the next operation may begin. Any work not meeting the approval of the District inspectors shall be rejected and redone until it meets their approval. The method of correction shall be approved by the Chief Engineer prior to proceeding. Should any work be done which proceeds past the point where inspector approval is required, the Contractor shall, at the option of the Chief Engineer, remove said work back to that point at no additional cost.

2. Cleaning and surface preparation of each streetlight shall be entirely completed and accepted before painting commences. All paint shall be suitably dry before any succeeding coat of paint is applied. Any paint applied without prior approval of the Chief Engineer to begin painting shall be removed. This corrective work shall be at the sole expense of the Contractor.

(M) MEASURE AND PAYMENT. The unit of measure for Clean and Paint Streetlight Pole will be per each**.** Payment will be made at the contract unit price per each pole. Payment will include all cleaning and surface preparation, application and protection of paint coatings, repair of damaged or unsatisfactory paint surfaces, preparation and submittal of all required procedures and information, performance of all additional work required by this specification and all labor, materials, tool, equipment, disposal of unsuitable materials and incidentals necessary to complete the work specified.

618.32 INSTALL ARM ON STREETLIGHT POLE

(A) GENERAL The Contractor shall provide all labor, materials and equipment necessary to furnish and install a metal arm on a streetlight pole owned by the District or any other utility company, as specified in the contract documents. All arms shall be installed as shown on the standard drawings or as specified in the contract documents. Work includes installing the necessary current carrying conductors and any protective moldings, grounding of the arm and installing the tap where the district owns the secondary conductors feeding the pole. Where the utility company owns the secondary conductors, the Contractor shall leave a 3' pigtail for the utility company's use in making the final connections.

All debris generated as part of this work shall become the property of the Contractor and shall be disposed of at no additional cost to the District.

(B) MEASURE AND PAYMENT

The unit of measure for Install Arm on Streetlight Pole will be per each arm complete in place. Payment will be made at the contract unit price per each. The payment will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work as specified herein.

618.33 INSTALL BANNER ARM ON STREETLIGHT POLE

(A) GENERAL. The Contractor shall provide banner arms on streetlight poles as specified in the contract documents and as directed by the Chief Engineer. The arms, including mounting hardware, shall be constructed of corrosion-resistant material. The contractor shall submit catalog cuts and samples to the Chief Engineer for approval before any orders are placed. The arms shall be mounted a minimum of 16' from the finished grade to the bottom of the lower arm and such that a 2' x 4' long banner can be installed by others. The contractor shall use care when mounting the banner arms so as not to damage the pole finish. The Contractor shall repair all damage to the pole and pole finish at no additional cost to the District.

All debris generated as part of this work shall become the property of the Contractor and shall be disposed of at no additional cost to the District.

(B) MEASURE AND PAYMENT. The unit of measure for Install Banner Arm on Streetlight Pole will be per each. Payment will be made at the contract unit price per each. The payment for installation will include all labor, tools, materials, equipment and all incidentals necessary to complete the work specified herein.

618.34 INSTALL STREETLIGHT GLOBE

(A) GENERAL. The work consists of providing streetlight globes of the size specified in the contract documents. The globes will be installed on "Washington" type poles. If refractors are specified, the work includes providing refractors and using manufacturer's hardware to complete the item of work.

(B) MEASURE AND PAYMENT. The unit of measure for Install Streetlight Globe will be per each. Payment will be made at the contract unit price per each. The payment for installation will include all labor, tools, materials, equipment, disposal of debris and all incidentals necessary to complete the work specified herein

618.35 INSTALL LUMINAIRES

(A) GENERAL. The Contractor shall furnish all labor, materials and equipment necessary to remove the existing fixture and install a high-pressure sodium (hps) vapor luminaire of wattage(s) as specified in the contract documents. All high pressure sodium vapor luminaires installed will be of cut-off type (Type III).

Materials shall be as per the contract documents and Section 800.

It is the responsibility of the Contractor to insure that the proper size luminaire is installed. Care must be taken during the installation of the luminaire so that the conductors are not damaged. All conductors damaged by the Contractor will be replaced at no cost to the District. The new luminaire shall be attached securely to the supporting arm or bracket in accordance with the manufacturer's instructions. All luminaires installed must be leveled during the installation, in accordance with the manufacturer's instructions to level the luminaire

In the case of luminaires installed on wood poles, the Contractor may be required to adjust the arm or bracket. If the arm or bracket has an adjustment turn buckle, the Contractor shall use the buckle to bring the luminaire into a level position. If the Contractor cannot adjust the arm so as to level the luminaire, the Contractor shall notify the Chief Engineer.

All conductors that terminate on the luminaire terminal block will be installed to ensure a good connection without damaging the conductors. The conductors should be pushed upward as far as possible away from the heat generated by the ballast. The Contractor will make sure that on luminaires with multi tap ballast, the taps are installed properly according to the manufacturer's instructions.

The photoelectric control shall be oriented so that the word NORTH is directed towards true north. The Contractor shall check to assure that the eye of the control is not facing a foreign light source.

The Contractor shall install a new lamp of the proper type and size. Before leaving the location, the Contractor shall cover the photoelectric control and check that the light is operating properly.

Removal and disposal of the existing fixture are incidental to this work. All debris generated and material removed by the Contractor shall become the property of the Contractor and removed from the site.

(B) MEASURE AND PAYMENT. The unit of measure for Install Luminaires will be per each complete luminaire furnished and/or installed. Payment will be made at the contract unit price per each. The payment for installation will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work as specified herein.

618.36 INSTALLCONVERSION KITS

(A) GENERAL The Contractor shall furnish all labor, material and equipment necessary to install high pressure sodium (hps) vapor conversion kit, lamp and night watchman photo cell.

Luminaires installed shall be of wattage as specified in the contract documents. The conversion kit shall be installed inside a #14 or #16 casing and/or other fixture housing, with the proper size and type lamps. Installation shall include the photocell.

During the installation the Contractor meet the following conditions:

1. Kit is held in place by a minimum of three (3) bolts.

2. Conductors are not placed in direct contact with the ballast assembly.

3. Feeder conductors and night watchman photocell lead wires are placed on terminal block or butt end crimped in the appropriate splices and taped.
4. The kit installation does not interfere with the installation and proper tightening of the globe holding devices.
5. The appropriate decal indicating the type and size will be placed on the street side of the casing.
6. The kit shall be mounted so that the lamp center is as close as possible to the center of the globe.

   All debris generated and material removed shall become the property of the Contractor and be removed from the site.

(B) MEASURE AND PAYMENT. The unit of measure for Install Conversion Kit will be per each conversion kit, lamp and photocell furnished and/or installed. Payment will be made at the contract unit price per each. The payment for installation will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work as specified herein.

618.37 REMOVAL OF LUMINAIRES AND ARMS

(A) DESCRIPTION. The Contractor shall remove all luminaires and arms on wood poles and luminaires on metal poles using bucket truck, after removing conductors from DC or PEPCO manhole. Removal of conductors shall be as follows:

1. Locate power source for underground conductors from a D.C. manhole or a PEPCO manhole for each luminaire.
2. Disconnect power from PEPCO power source before removal of conductors.
3. Remove all underground streetlight conductors from manholes.

(B) MEASURE AND PAYMENT. The unit of measure for Removal of Luminaire and Arm will be each. Payment for luminaire removal from wood pole will be made at the contract unit price per each, which payment will include all labor, equipment, tools, materials and incidentals necessary to complete the work specified herein.

No separate measure or payment will be made for the removal of light arm from steel pole, when pole itself is removed. The cost would be incidental to pay item for removal of the steel pole.

618.38 INSTALL SCHEDULE 40 PVC U-GUARD

(A) GENERAL. The Contractor shall furnish all labor, materials and equipment necessary to furnish and install pvc u guard on a wood pole owned by the District or any other utility company as shown in the contract documents or when the Contractor receives a work order from the District. The size to be installed will be stated in the contract or on the work order.

The Contractor shall install a guard any time that he installed a service to underground street and/or alley lights fed from overhead secondary conductors or an underground fed light installed on a wood pole. When required by the contract documents or the work

order, the Contractor shall install a u-guard (starting from grade level) on each pole, in order to protect underground to overhead feeder cables. The cost of all mounting hardware shall be included as part of this work. All debris generated as part of thiswork shall become the property of the Contractor and shall be disposed of at no additional cost to the District.

On wood poles, the contractor shall install the u-guard over the street light feeder cable running up the side of the pole to shield the cables from other utilities (replacing missing or damaged existing u-guard or if a new installation).

(B) MEASURE AND PAYMENT. The unit of measure for Install Schedule 40 PVC U-Guard will be for each linear foot furnished and installed. Payment will be made at the contract unit price per each. The payment will include all labor, equipment, tools, materials, and all incidentals necessary to complete the work as specified herein.

618.39 INSTALL GROUND ROD

(A) DESCRIPTION.

New Manholes:

The Contractor shall provide a ground rod for all new DC owned manholes as indicated in the contract documents. The manholes shall be thoroughly grounded with bare copper wire, size as noted, and braced to the manhole structures and connected to ground rods as shown in the contract documents. Grounding shall be accomplished as soon as materials are in place to which the grounding wires are to be attached.

All ground rods shall be ¾ inch diameter 10-ft long copper clad steel. All the sizes called for in these specifications or as shown in the contract documents are American Wire Gauge sizes. The grounding wire or cables shall conform to the requirements of ASTM B8. Ground wires shall be soft drawn.

Existing Wood Poles:

The Contractor shall inspect existing streetlight wood poles identified in the contract documents, in work orders or as directed by the Chief Engineer, for the existence of an electrically sound ground system for the streetlight mast arm. If no ground path is found, the Contractor shall notify the Chief Engineer who may issue an approval or work order for the installation of a grounding system.

If the approval/work order is issued, the Contractor shall install a ¾" ground rod at the base of the pole in such a way as to have a minimum soil contact of eight (8) foot. A ground wire shall be provided and connected to the rod by thermite welding. The ground wire shall be attached to the street light arm with approved clamp. A one inch (1") U-Guard shall be installed to protect the ground wire from grade level to a minimum of 8 ft. up the pole.

Existing Manholes

DC Manholes or manholes identified in the contract documents will be checked to verify the existence of a ground rod. If no ground rod is found, a ¾ " ground rod shall be installed through the floor of the manhole in such a way as to have a minimum soil

contact of 8 feet. The Contractor shall make the electrical connections in the existing D.C. manholes between the ground rod, neutral conductor and any ground wires using exothermic welds and cover the welds and exposed cables with two coats of insulating varnish.

(B) MEASURE AND PAYMENT. The unit of measure for Install Ground Rod will be each. Payment for a new ground rod will be made at the contract unit price per each. The payment will include all labor, equipment, tools, materials and incidentals necessary to complete the work as specified herein.

618.40 PAYMENT TO TRAFFIC SIGNAL CONTRACTOR FOR CONNECTION AND DISCONNECTION OF TRAFFIC SIGNAL CABLES

(A) GENERAL. The Contractor shall make payments to the District-designated contractor for Traffic Signal cable connections and disconnections for combination streetlight/traffic signal poles. DC forces or District-designated traffic signal contractor will perform all traffic signal cable disconnection and connection. Up to four (4) visits by the traffic signal contractor may be needed per combination pole.

The Contractor shall include in his bid the amount shown in the Pay Item Schedule to pay the traffic signal contractor for work performed as required in the contract. The traffic signal contractor will submit all invoices to the Contractor for payment. After payment has been made, the Contractor shall submit the paid invoices to the Chief Engineer for reimbursement by the District. The District will pay the Contractor only the invoice amount.

(B) MEASURE AND PAYMENT. The unit of measure will be per hour of Traffic Signal Contractor crew. Payment will be made to the Contractor based on paid Traffic Signal Contractor's invoices. Contractor mark-up shall not be allowed.

618.41 PAYMENT TO PEPCO FOR CONNECTION, DISCONNECTION AND INSPECTION OF SERVICE TO STREETLIGHTS

(A) GENERAL. The Contractor shall make payments to the Potomac Electric Power Company (PEPCO) for service connections, disconnections and PEPCO manholes entry fees. Up to two (2) visits by pepco forces may be needed. The PEPCO manhole entry fee package will be enclosed with the contract documents.

The Contractor must schedule his work around two (2) PEPCO manhole entries per manhole; any additional service visits will be the responsibility of the Contractor at no additional cost to the District. The Contractor shall include in his bid the amount shown in the Pay Item Schedule to pay PEPCO for work performed as required in the contract. PEPCO will submit all invoices to the Contractor for payment. After payment has been made, the Contractor shall submit the paid invoices to the Chief Engineer for reimbursement by the District. The District will pay the Contractor only the invoice amount.

(B) MEASURE AND PAYMENT. The unit of measure will be per hour of PEPCO crew. Payment will be made to the Contractor based on the paid pepco invoices. Contractor markup shall not be allowed.