

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT			1. Contract Number DCKA-2013-B-0141	Page of Pages 1 84
2. Amendment/Modification Number Three (3)	3. Effective Date See 16C	4. Requisition/Purchase Request No.	5. Solicitation Caption: FY-2013 Citywide Traffic Signal Maintenance	
6. Issued By: District Department of Transportation Roads and Highway Division 55 M Street, SE, 7th Floor Washington DC 20003		Code	7. Administered By (If other than line 6) District Department of Transportation Traffic Operations Administration 55 M Street SE 6th Floor Washington DC 20003	
8. Name and Address of Contractor (No. Street, city, country, state and ZIP Code)			(X)	9A. Amendment of Solicitation No. Three (3)
				9B. Dated (See Item 11) September 16, 2013
				10A. Modification of Contract/Order No.
				10B. Dated (See Item 13)
Code		Facility		
11. THIS ITEM ONLY APPLIES TO AMENDMENTS OF SOLICITATIONS				
<input checked="" type="checkbox"/> The above numbered solicitation is amended as set forth in Item 14. The hour and date specified for receipt of Offers <input checked="" type="checkbox"/> is extended, <input type="checkbox"/> is not extended. Offers must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation or as amended, by one of the following methods: (a) By completing items 8 and 15, and returning 1 copies of the amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or fax which includes a reference to the solicitation and amendment number. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE PLACE DESIGNATED FOR THE RECEIPT OF OFFERS PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If by virtue of this amendment you desire to change an offer already submitted, such change may be made by letter or fax, provided each letter or telegram makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.				
12. Accounting and Appropriation Data (If Required)				
13. THIS ITEM APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS, IT MODIFIES THE CONTRACT/ORDER NO. AS DESCRIBED IN ITEM 14				
A. This change order is issued pursuant to: (Specify Authority) The changes set forth in item 14 are made in the contract/order no. in item 10A.				
B. The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation date, etc.) set forth in item 14, pursuant to the authority of 27 DCMR, Chapter 36, Section 3601.2.				
C. This supplemental agreement is entered into pursuant to authority of:				
D. Other (Specify type of modification and authority)				
E IMPORTANT: Contractor <input type="checkbox"/> is not, <input checked="" type="checkbox"/> is required to sign this document and return _____ copies to the issuing office.				
14. Description of amendment/modification (Organized by UCF Section headings, including solicitation/contract subject matter where feasible.)				
<p>The subject solicitation is amended as follows:</p> <p>Questions and responses generated from the pre-bid conference are attached to ensure contractor's compliance with the solicitation.</p> <p>No additional questions will be taken into consideration.</p> <p style="text-align: center;">The bid opening date has been extended to: OCTOBER 7, 2013 @ 2:00 p.m.</p>				
Except as provided herein, all terms and conditions of the document referenced in Item (9A or 10A) remain unchanged and in full force and effect				
15A. Name and Title of Signer (Type or print)			16A. Name of Contracting Officer Courtney B. Lattimore	
15B. Name of Contractor		15C. Date Signed	16B. District of Columbia	16C. Date Signed
(Signature of person authorized to sign)			(Signature of Contracting Officer)	9/26/2013

Pre-Bid Clarification and Questions/Answers

CLARIFICATIONS

1. Warranty in DMS project

DDOT shall direct contractor for required maintenance depending on the type of work. It should be noted that per our contract (special provisions) with our existing contractor building the system provides us a guarantee on equipment and/or services against defective material and workmanship for a period of two years starting from the date of acceptance. This does not cover damages done through misuse and operator neglect. DDOT shall determine which party shall attend the maintenance requirement.

2. Optimization project description

BACKGROUND

Due to significant amount of development activities within the District, regional growth, installation of new traffic signals, changing of travel patterns, as well as the conflicts between different modes of travel – District Department of Transportation (DDOT) has decided to perform a district-wide traffic signal optimization. *The central goal of the optimization project will be to make DC traffic signals safer and friendlier for the pedestrians, improve bus running times & reduce bus delays, improve overall traffic flow and reduce vehicular traffic emissions.*

The project would include 1600 plus traffic signals and involve dividing the entire network into smaller networks, and preparing new signal timing plans to improve pedestrian and vehicular mobility. Following is a brief summary of District's traffic signal system:

- All District signalized intersections currently operate on the 170 traffic signal controller platform and utilizes FSK modems that are hard-wired via 19 gauge twisted pair, to the traffic control center located at the Reeves Center (also IP capable).
- QuicNet, the District's central traffic signal and CCTV command and control system, utilizes once per second polling while monitoring all traffic signals within the District, and one signal on the Suitland Parkway just across the city limit.
- QuicNet broadcasts time of day to all intersections and maintains downloadable programming data and event logging for all intersections within a central server. Programming data can be manually downloaded from central, or can be requested by specific key strokes on the intersection's controller.

- The District's traffic signal system is currently capable of utilizing up to 9 pre-programmed plans; primarily utilizing 4 timing plans based on AM peak, Mid-day, PM Peak, and nights and weekend traffic patterns.
- Each local controller can also maintain multiple special event schedules that can be called by time, date, and year.
- The District system is capable of programming cycles up to 240 seconds and maintains one 240 plan for emergency evacuation along regionally based published evacuation routes.
- The District system also maintains plans specific to Nationals Park events.
- The system maintains traffic signals which operate under both interval and NEMA phase based controls. Majority of the traffic signals in the District operate under interval based pre-timed control.
- The District also operates one H.A.W.K. signal at Georgia Avenue and Hemlock NW.
- The District operates several corridors with reversible lanes, based on AM and PM peak patterns, including manually operated movable barriers on the Roosevelt bridge.
- The District also maintains a flexible time based, local lane control firmware, primarily used during roadway, and bridge construction projects.

The following tasks are performed under the traffic optimization contract

TASKS

1.0 Develop a list of smaller networks from the larger network of 1600 plus traffic signals so that the smaller networks would be suitable for phased implementations. Review the existing signal system and available in-house data to develop a data collection plan and also the timing implementation plan for each phases.

2.1 Data collection including, but not limited to: (1) Turning movement counts including pedestrian activity for AM, Midday, PM, Off-peak and Weekend. Counts will be collected when schools are in session with weekday counts to be performed between Tuesdays and Thursdays. Weekday counts include 3-hour AM peak, 2-hour mid-day peak, and 4.5-hour PM peak counts. Weekend counts will primarily include 5-hour counts during Saturday peak hours. Turning movement and tube counts at select locations may also be performed on Sundays. (2) Signal data – Consultant should collect signal data such as phase/interval timings, co-ordination data, and phasing/TS diagrams. (3) Geometric data – to include width of pedestrian crosswalks, intersection width, land use, lane configurations, link distances between intersections, storage

lengths for exclusive turning lanes, lane drops, speed limits, approach grades, parking conditions, bus-stops, etc. Collection of transit volume data traveling through the District traffic signals including frequencies and dwell times will be requested for select corridors.

Intersection sketches or condition diagrams must be provided based on the existing conditions. Legible hand-drawn sketches will be acceptable. Counts will be provided to DDOT in both hard copy and electronic formats.

2.2 Before implementation travel time data for AM/PM peak periods but not limited to these periods. For certain corridors, transit travel times will be requested.

3.1 Evaluation of pedestrian clearance intervals for all signals, based on the District and new MUTCD standards. Evaluation of vehicular Clearance (Yellow and All Red) intervals for all signals based on the District and ITE standards. Work will also include conversion of existing FW intervals to steady WALK intervals at locations where FW intervals are still active. Modification of any such signal phases including adding a new clearance interval under the interval-based control will require the contractor to furnish a revised TS drawing and corresponding configuration package.

3.2 Conversion of simple two-phase four-legged intersections from interval based operation to NEMA phase-based control. This will require a revision to the TS drawing and development of a corresponding configuration package.

4.0 Assist District in establishment of warrants for leading pedestrian intervals (LPI).

5.0 Create volume balance worksheets based on the new volumes (AM, Mid-day, PM, Evening Off-Peak, and Weekend).

6.0 Network set up and coding of existing conditions in Synchro using District roadway layer as the background. DDOT's existing Synchro files can be used for this purpose but these files must be updated to reflect existing conditions.

7.0 Signal Timing Plan Development and Optimization, including but not limited to, the development of signal timing plans and the evaluation of the results using Synchro and SimTraffic. Cycle lengths should be adequate to accommodate all pedestrian activities. The plans must be supported by vehicular traffic progression (time-space diagram). For time-based coordination (TBC), different timing plans will be developed for AM peak, PM peak, Mid-day, Evening off-peak/Late Night, and weekends.

8.0 Development of Dial sheets using the District format and TS Drawings/configuration packages. The District will provide Consultant with template for timing sheets. Assist District staff in implementing new co-ordination timing plans along with updated vehicular and pedestrian clearances. The contractor must have prior experience in working with the QuicNet system and also developing configuration packages. The contractor must be capable of making

the necessary changes in the signal cabinet to modify a signal phasing as part of the implementation effort.

DDOT will provide the complete list of locations which would require modification to the TS drawings, development of the configuration packages, and field implementation of the new intervals/phasings requiring cabinet level work.

9.0 Field adjustments (fine-tuning) and corresponding Synchro/timing sheets updates during the implementation phase.

10.0 Conduct after implementation travel time runs with time periods to match with before implementation data collection.

11.0 Evaluation of signal timing improvements and changes in the Measure of Effectiveness (MOEs) based on both travel time runs and the software generated output.

12.0 Development of evacuation and emergency timing plans on select corridors. Development of special timing plans such as planned events on the mall, Nationals stadium events may be requested.

13.0 Submission of five hard copies (with companion soft copy) of the final project report by compiling vital information from all the tasks above. All electronic files used to develop the optimized timing plans are to be submitted to DDOT. Training of District staff in the maintenance of Synchro/SimTraffic files developed as part of this project.

QUESTIONS AND ANSWERS

1. Question: What will be the mobilization period from NTP until work begins?

Response: The successful contractor shall be required to mobilize immediately upon receipt of a Notice to Proceed (NTP) issued by the Department of Transportation (DDOT).

2. Question: During the pre-bid, DDOT expressed the desire to have the software system interface with Cityworks. In order to expedite that, can you provide the available exchange protocols?

Response: DDOT will provide the functional requirements of the complete Traffic Incident Management and Maintenance System. The successful contractor will be required to maintain the system.

3. Question: Concerning the emergency generators, will they be delivered to the warehouse facility or will they need to be picked up?

Response: The generators will be physically located at DDOT's warehouse facility on West Virginia Avenue NE for pickup.

4. Question: Concerning the Bluetooth scanner requirement for the wireless tablets, what does DDOT anticipate needing to be scanned that would not be available electronically?

Response: DDOT's equipment inventory is located at the West Virginia Avenue NE warehouse.

5. Regarding the existing CIP system:

Question: When was it installed?

Response: 2009

Question: By whom was it installed?

Response: M. C. Dean, Inc. (current maintenance contractor)

Question: Who maintains it now?

Response: M. C. Dean, Inc. and Antonio -Transfield Services

Question: Can you provide more detailed specifications (schematics, backbone fiber routing, etc.)?

Response: See attached schematics entitled: DDOT Critical Infrastructure Protection System

6. Question: During the pre-bid it was stated that streetlights on combination poles will fall under the responsibility of this contract. Is that all streetlight maintenance, or only lighting assets that are damaged by a knockdown?

Response: No concerning the first part of the question and yes (damaged or compromised).

7. Question: On the average, how many conflict monitors and controllers are replaced/installed annually?

Response: Traffic Signal Controllers and Conflict Monitors:

From October 2012 to August 2013

Repaired CMU: 318 each

Repaired 170 Controller: 575 each

Install New 170 Controller: 39 each

Install New CMU: 42 each

8. Question: Please confirm that DDOT will supply the existing inventory of equipment. Can you provide the link for the GIS layer containing the traffic signal inventory?

Response: There is no inventory of equipment. The successful contractor is required to have equipment in inventory. The link for GIS is: <http://atlasplus.dcgis.dc.gov/>.

9. Question: Concerning the software system, how many accesses will be required for DDOT? At what access levels?

Response: Currently the contractor is the lead. DDOT has overall access with many users at various levels of access.

10. Question: Who will host the server, the contractor or DDOT?

Response: The contractor.

11. Question: In our similar traffic signal contracts worldwide, our proprietary software is also used to inventory and manage video surveillance cameras, vehicle-charging stations. Is it something that DDOT would also be interested in?

Response: No, not at this time.

ATTACHMENTS (in response to Pre-Bid Conference Inquiries)

1. DDOT Critical Infrastructure Protection (CIP) System
2. DDOT VDS Specifications
3. VDS Intersection Locations
4. Proposed DMS Plans

<\\SDDOTFILE\ddotmain\ITS\DMS Project\100 Percent Design\ddot dms advertised plan 7-18-12.pdf>

CRITICAL INFRASTRUCTURE PROTECTION (CIP) SYSTEM

C.1 SCOPE

The District of Columbia OCP on behalf of the DDOT Traffic Operations Administration (TOA) intends to enter into a performance-based contract for Critical Infrastructure Protection system deployment at locations within the District of Columbia as specified herein.

C.1.1 Through this contract, the Contractor shall assume the responsibility for furnishing, constructing, installing and testing a “state-of-the-art” intelligent video detection and surveillance system at the 3rd Street Tunnels (Mall and Air Rights) to monitor and detect abnormal conditions at this location, with an opportunity (through an additive alternative) to deploy the system at the Theodore Roosevelt Bridge. The project includes the following elements:

C.1.1.1 New Video Surveillance System – The video surveillance system consists of fixed and pan/tilt/zoom (PTZ) dome day/night cameras that provide continuous coverage of the roadway and critical areas. The cameras shall be analog cameras with integrated fiber optic transceivers that provide transport for the video signal and PTZ control. Although the cameras are analog, the surveillance system shall be IP-based (Internet Protocol). Each camera signal shall communicate to a communications cabinet (hub) and shall be encoded to an IP signal. The video encoders shall employ MPEG-4 compression with 4CIF resolution.

C.1.1.2 New Intelligent Video Detection System – The intelligent video detection system shall be a software-based system installed on Commercial off the Shelf (COTS) network servers in each hub cabinet. Each hub shall contain equipment (network servers) to record and provide detection for each camera signal at that site using defined criteria described in the specifications.

C.1.1.3 Traffic Management Center integration/modification – This system shall be monitored and controlled from the HSEMA. HSEMA shall monitor video and alarms generated by this system. The CIP head end equipment shall be located in a dedicated cabinet in the TMC equipment room in the Reeves building. The equipment shall connect to HSEMA via an HSEMA provided WAN connection and the TMC Local Area Network (LAN) and shall be the access point for sharing video to other law enforcement and first responder agencies.

C.1.1.4 Communications Requirements – Each hub cabinet shall communicate to the head end equipment cabinet located in the TMC equipment room. The cabinets shall utilize Ethernet over twisted pair technology which shall be transported over the existing DDOT traffic signal copper plant.

C.1.2 Applicable Documents

The Contractor shall use the documents in the following table to guide its work on this contract. The Contractor shall use the latest version of each of the documents in conducting the work,

The Contractor shall be responsible for ensuring that it has and is using the latest version of these documents at the time that the affected work is being conducted. These documents are incorporated by reference and shall be made a part of the contract.

Item No.	Document Type	Title	Date
1	Communication Technology Standards	Technology Standards at a Glance	Latest Version
2	Special Provisions	DDOT Special Provisions for Critical Infrastructure Protection System	Latest Version (Oct. 9, 2009)
3	Design and Integration Drawings	DDOT Design and Integration Drawings for Critical Infrastructure Protection System	Latest Version (Oct. 9, 2009)
4	Standard Item Specifications	DDOT Standard Specifications	Latest Version
5	Pepco Electric Service Design Manual and Standard Drawings Manual	Pepco	Developer

http://www.pepco.com/_res/documents/Customer_Design_Manual-Final.pdf

<http://www.pepco.com/business/services/new/res/#stand> Latest Version

C.1.3 Definitions and Acronyms

C.1.3.1 ANSI: American National Standards Institute

C.1.3.2 AASHTO: American Association of State Highway and Transportation Officials

C.1.3.3 ASTM: American Society for Testing and Materials

C.1.3.4 BTU: British Thermal Unit

C.1.3.5 CCTV: Closed Circuit Television

C.1.3.6 CD: Compact Disk

C.1.3.7 CIF: Common Intermediate Format

C.1.3.8 CIP: Critical Infrastructure Protection

C.1.3.9 Contract Award Date: Date on which the District's Contracting Officer signs the contract. The term of the contract shall be for a period of five (5) years from the Contract Award Date.

C.1.3.10 COTS: Commercial-off-the-shelf

- C.1.3.11 dB: Decibel
- C.1.3.12 DDOT: District Department of Transportation
- C.1.3.13 District Business Day: A District Business shall consist of days Monday through Friday and shall exclude legal Holidays observed by the District Government.
- C.1.3.14 DVD-RW: Digital Video Disk – Read/Write
- C.1.3.15 EIA: Electronic Industries Alliance
- C.1.3.16 FPS: Frames Per Second
- C.1.3.17 GB: Gigabyte
- C.1.3.18 GHz: Gigahertz
- C.1.3.19 GIS: Geographic Information Systems
- C.1.3.20 GUI: Graphical User Interface
- C.1.3.21 HSEMA: Homeland Security and Emergency Management Agency
- C.1.3.22 HVAC: Heating, Ventilation and Air Conditioning
- C.1.3.23 ICEA: Insulated Cable Engineers Association
- C.1.3.24 IEEE: Institute of Electrical and Electronics Engineers
- C.1.3.25 IP: Internet Protocol
- C.1.3.26 IT: Information Technology
- C.1.3.27 KVM: Keyboard, Video and Mouse
- C.1.3.28 LAN: Local Area Network
- C.1.3.29 LCD: Liquid Crystal Display
- C.1.3.30 MB: Megabyte
- C.1.3.31 MHz: Megahertz

- C.1.3.32 MTBF: Mean Time Between Failures
- C.1.3.33 MUTCD: Manual on Uniform Traffic Control Devices
- C.1.3.34 NEC: National Electrical Code
- C.1.3.35 NEMA: National Electrical Manufacturers Association
- C.1.3.36 NESC: National Electric Safety Code
- C.1.3.37 NETA: National Electrical Testing Association
- C.1.3.38 NMS: Network Management System
- C.1.3.39 NVR: Network Video Recorder

- C.1.3.40 OTDR: Optical Time Domain Reflectometer
- C.1.3.41 PTZ: Pan, Tilt and Zoom
- C.1.3.42 RAM: Random Access Memory
- C.1.3.43 RU: Rack Unit
- C.1.3.44 SFP: Small Form-Factor Pluggable
- C.1.3.45 SNMP: Simple Network Management Protocol
- C.1.3.46 TIA: Telecommunications Industries Association
- C.1.3.47 TMC: Traffic Management Center
- C.1.3.48 TR: Theodore Roosevelt
- C.1.3.49 UL: Underwriters Laboratory
- C.1.3.50 UPS: Uninterruptible Power Supply
- C.1.3.51 VAC: Alternating Current Voltage
- C.1.3.52 WAN: Wide Area Network
- C.3.3.53 Shall, Will and Must: Note that these terms are used synonymously and connote a requirement.

C.2 BACKGROUND AND OBJECTIVES

C.2.1 Background

C.2.1.1 The Critical Infrastructure Protection System is a key element of DDOT's ongoing efforts to enhance the protection of critical transportation infrastructure and provide a higher level of safety for the public. DDOT currently operates a Traffic Management Center (TMC) located within Homeland Security and Emergency Management Agency (HSEMA) operations, with a secondary operations center at the Reeves building. DDOT also has Roadway Operations Patrollers (ROPs) that help to facilitate incident management and incident response. Infrastructure is protected by routine inspections, patrols and observations of ROPs and the Metropolitan Police Department (MPD), and by video observation (where available) at HSEMA and the TMC at the Reeves building. The CIP System shall extend and enhance these efforts aimed at deterring, preventing, and responding to incidents at DDOT facilities, as well as maintaining the facilities themselves. The proposed solution shall facilitate surveillance, information gathering and analysis, detection, information dissemination, control, dispatch, administration and documentation.

C.2.1.2 DDOT's Mission is to provide safe and efficient movement of people and goods in and around the District. In fulfillment of this Mission, DDOT has identified two key project goals associated for CIP System deployment:

C.2.1.2.1 Protect critical transportation infrastructure from threats of terrorist activity and other security threats.

C.2.1.2.2 Provide additional surveillance to support traffic management and infrastructure maintenance.

C.2.1.3 Key project stakeholders for the DDOT CIP System include the District Department of Transportation (various branches and divisions), the Metropolitan Police Department (MPD), and HSEMA.

C.2.2 Objectives

The overall objectives of this RFP are to procure the services of a Contractor who shall furnish, construct, install, integrate, and test a CIP system for DDOT, with the goal of meeting the following threshold objectives:

C.2.2.1 Provide electronic surveillance and intelligent video detection of potential security threats and other incidents at the 3rd Street Tunnels (Mall and Air Rights), in accordance with the requirements specified herein and detailed in the specifications and design plans.

C.2.2.2 Provide electronic surveillance and intelligent video detection of potential security threats and other incidents at the TR Bridge meeting in accordance with the

requirements specified herein and detailed in the specifications and design plans. TR Bridge elements of the project are included in this RFP as an additive alternative.

C.2.2.3 Provide communications system to connect field Communications Cabinets to control room at HSEMA and the DDOT TMC as specified herein and detailed in the specifications and design plans. Communications requirements for the 3rd Street Tunnel shall be included as part of the base bid; communications requirements for the TR Bridge are included in this RFP as an additive alternative. DDOT shall provide a minimum of two (2) pairs of copper wire in their existing infrastructure which should provide, with specified equipment, a minimum of 10 Mbps throughput for the CIP system. Using MPEG 4 encoders, with adjustable resolutions and frame rates the CIP system is required to provide four (4) simultaneous switched video streams, four (4) alarm video streams, and data for events logs. Alarm video shall have priority bandwidth allocation over the switched video. The system shall be capable of increasing the number simultaneous video streams if the number of copper pairs increases or if the proposed Ethernet modems exceed the throughput requirements.

C.2.2.4 HSEMA shall be the primary operators of the CIP system and the TMC located at the Reeves building the secondary control center. The Contractor shall coordinate all work with the building owner including the U.S. Department of Labor.

C.3 REQUIREMENTS

Unless otherwise noted, the Contractor shall be responsible for providing all materials, equipment, and labor necessary to complete the tasks to the appropriate performance standard. Except where specifically noted, there shall be no government-furnished labor, materials, equipment, office space, storage areas or other items necessary to complete the work. The Contractor's office and storage areas must physically be located in the District of Columbia.

The requirements for the contract are organized into 2 parts, each representing a separate set of Contract Line Items (CLINS) for which pricing is requested. The first set of CLINS, as defined in section B.3.3 is for the 3rd Street Tunnel Base Bid and shall be procured as a group. The second set of CLINS, section B.3.4, is for the Theodore Roosevelt Bridge Additive Alternative and shall be procured as a group. All of the CLINS for this project are described below.

C.3.1 FURNISH AND INSTALL NETWORK SERVERS (CLIN 0001 AND ADDITIVE ALTERNATIVE CLIN 0042)

C.3.1.1 Special Provision Pay Item No. 630 08

C.3.1.2 Work under this item shall consist of furnishing and installing a network server as described herein. The server shall be capable of operating software for video application/management and Intelligent Video Detection System. The server shall be capable

of recording and analyzing 8 video streams (cameras) in real-time and time-lapse modes, at a minimum. Contractor shall demonstrate to DDOT video streams at different frame rates. DDOT shall select separate settings for each individual camera. Recording rates shall be programmed by the Contractor for, at a minimum, near real-time for alarms, and time-lapse recording of all other events. The server shall also include video management software, keyboard, mouse and monitor. Software shall be Windows-based and allow remote accessibility with appropriate security features.

C.3.1.3 Refer to Intelligent Video Detection System section of these Special Provisions for software functionality.

C.3.1.4 Network Server minimum requirements:

C.3.1.4.1 Rack mountable.

C.3.1.4.2 Dual 2.4 GHz Xeon quad core processors; 1066 MHz front side bus.

C.3.1.4.3 Hard Drive(s) to be sized for a minimum of 7 days of recording storage at 15 FPS with 4CIF resolution plus enough space required for Intelligent Video Detection System and NVR software.

C.3.1.4.4 16 GB Memory; 667 MHz.

C.3.1.4.5 Graphics Card.

C.3.1.4.6 Dual Gigabit Network Interface Cards.

C.3.1.4.7 8 Hard Drive backplane.

C.3.1.4.8 ISO 9001-compliant manufacturer.

C.3.1.4.9 DVD-RW for video archiving.

C.3.1.4.10 Server shall exceed the minimum requirements for the intelligent video software if the requirements stated previously do not.

C.3.1.5 Install network servers according to manufacturers recommendations. Contractor shall provide all required cabling, software, operating systems, licenses and ancillary hardware and components to professionally install and provision the network servers as an integral part of the CIP System.

C.3.1.6 Each Network Server shall be paid at the contract unit price. Payment shall include all labor, material, testing equipment and all incidentals to complete the work described herein.

C.3.2 FURNISH AND INSTALL WORKSTATIONS (CLIN 0002)

C.3.2.1 Special Provision Pay Item No. 630 10

C.3.2.2 Work under this item shall consist of furnishing and installing two new workstations; 1 at HSEMA and the other at the 3rd Street Tunnel Control Room. The workstations shall be used to monitor alarms, view live and recorded video, and provision the Video Detection and video management software, The work station shall have a Windows-based operating system and the following minimum requirements:

C.3.2.2.1 3.16 GHz dual core processor; 1333 MHz front side bus.

- C.3.2.2.2 4 GHz memory; 667 MHz.
- C.3.2.2.3 750 GB Hard Drive.
- C.3.2.2.4 16x CD/DVD RW Drive.
- C.3.2.2.5 4-20" LCD Monitors.
- C.3.2.2.6 1024 MB video card.
- C.3.2.2.7 10/100/1000 BaseT Network Card.

C.3.2.3 Install workstations according to manufacturer's recommendations at locations designated by DDOT in the HSEMA and 3rd Street Tunnel Control Room. Contractor shall provide all required cabling, software, operating systems, licenses and ancillary hardware and components to professionally install and provision the workstations as an integral part of the CIP System.

C.3.2.4 Each workstation shall be paid at the contract unit price. Payment shall include all labor, material, testing equipment and all incidentals to complete the work described herein.

C.3.3 FURNISH AND INSTALL KVM SWITCH (CLIN 0003 AND ADDITIVE ATERNATIVE CLIN 0043)

C.3.3.1 Special Provision Pay Item No. 630 12

C.3.3.2 A KVM switch shall be installed in communications cabinets and the TMC equipment room to access and configure multiple servers and any designated PC-based equipment with one keyboard, mouse and monitor, and shall be sized accordingly. The switch shall have the following characteristics:

- C.3.3.2.1 1 RU.
- C.3.3.2.2 Rack-mountable drawer.
- C.3.3.2.3 120VAC; 60Hz.
- C.3.3.2.4 Combination KVM switch, monitor, keyboard and mouse.
- C.3.3.2.5 Video Supported: VGA, SVGA, XGA, XGAII.
- C.3.3.2.6 Compatible with server software.
- C.3.3.2.7 Sized to accommodate all network equipment in the cabinets requiring monitor, keyboard and mouse.

C.3.3.3 Install KVM Switch according to manufacturer's recommendations. Contractor shall provide all required cabling and ancillary hardware and components to professionally install and provision the workstations as an integral part of the CIP System.

C.3.3.4 Each KVM Switch shall be paid at the contract unit price. Payment shall include all labor, material, and all incidentals to complete the work described herein

C.3.4 FURNISH AND INSTALL NETWORK SWITCHES (CLIN 0004 AND ADDITIVE ALTERNATIVE CLIN 0044)

C.3.4.1 Special Provision Pay Item No. 630 14

C.3.4.2 The Video Surveillance System shall connect to a dedicated CIP System network via 48-port (minimum) Network Switches located in the proposed communications cabinets and the CIP System headend cabinet in the TMC equipment room.

C.3.4.3 The Contractor shall coordinate with HSEMA and DDOT IT Department for configuration and connection to HSEMA and the TMC LAN.

C.3.4.4 The switch shall have the following characteristics:

- C.3.4.4.1 Minimum of 48 10/100/1000 Base-T Ethernet ports.
- C.3.4.4.2 SFP Gigabit uplink ports.
- C.3.4.4.3 1 RU.
- C.3.4.4.4 RJ-45 Connectors.
- C.3.4.4.5 Port indicators: Link Integrity, disabled, activity, speed, full-duplex.
- C.3.4.4.6 System indicators: System, RPS, link status, link duplex, link speed.
- C.3.4.4.7 120VAC, 60 Hz.
- C.3.4.4.8 UL Listed.
- C.3.4.4.9 FCC Part 15 Class A.

C.3.4.4.5 Install Network Switches according to manufacturer's recommendations. Contractor shall provide all required cabling, licensing and ancillary hardware and components to professionally install and provision the Network Switches as an integral part of the CIP System.

C.3.4.5.6 Each Network Switch shall be paid at the contract unit price. Payment shall include all labor, material, and all incidentals to complete the work described herein.

C.3.5 FURNISH AND INSTALL PAN/TILT/ZOOM (PTZ) DOME CAMERAS (CLIN 0005 AND ADDITIVE ALTERNATIVE CLIN 0045)

C.3.5.1 Special Provision Pay Item No. 630 16

C.3.5.2 Provide high-resolution PTZ dome color cameras at locations designated on the Design Drawings. Provide all necessary hardware, power supplies and cabling needed for mounting, powering, controlling and transmitting video to respective equipment. Cameras shall have 1/4" imager with auto-iris and auto-focus (with manual override) and have a high-speed pan and tilt mechanism. Video signal shall be NTSC format. Dome cameras shall have the following characteristics:

- C.3.5.2.1 Day/Night capability (outdoor units).
- C.3.5.2.2 35x optical and 12x digital zoom.
- C.3.5.2.3 Digital image stabilization.
- C.3.5.2.4 Auto flip feature.
- C.3.5.2.5 User defined tours.
- C.3.5.2.6 360-degree continuous pan.
- C.3.5.2.7 0-90 degree tilt.

- C.3.5.2.8 Operating Temperatures: -40°F to 122°F (outdoor units).
- C.3.5.2.9 Humidity: 0-100% condensing.
- C.3.5.2.10 Electrical: 21-28 VAC.
- C.3.5.2.11 Control Data: RS-485.
- C.3.5.2.12 Shall have an integrated fiber optic modem.
- C.3.5.2.13 Environmental Rating of IP66 or NEMA 4X certified.
- C.3.5.2.14 Mounting
 - C.3.5.2.14.1 Dome cameras shall be capable of several mounting configurations: pole, wall, pendant, ceiling and parapet. All cameras shall be mounted according to the manufacturer's specifications. Mounting shall be aesthetically pleasing and DDOT shall approve finish. All outdoor hardware shall be galvanized or coated with a weatherproof finish.
 - C.3.5.2.14.2 Exterior mounts shall be designed and installed so that the camera shall not vibrate due to winds and shall not be obscured by snow accumulation.

C.3.5.3 Install Dome Cameras according to manufacturer's recommendations and Design Drawings. Contractor shall provide all required cabling and ancillary hardware and components to professionally install Dome Cameras as an integral part of the CIP System.

C.3.5.4 Each Dome Camera shall be paid at the contract unit price. Payment shall include all labor, material, and all incidentals to complete the work described herein.

C.3.6 FURNISH AND INSTALL FIXED CAMERAS (CLIN 0006 AND ADDITIVE ALTERNATIVE CLIN 0046)

C.3.6.1 Special Provision Pay Item No. 630 18

C.3.6.2 Provide high-resolution color stationary cameras at locations designated on the Design Drawings. Provide all necessary hardware, power supplies and cabling needed for mounting, powering and transmitting video signals to respective equipment. The Imager shall be ¼" minimum and shall be mounted in a housing rated outdoor. Fixed cameras shall have the following characteristics:

- C.3.6.2.1 Electrical: 21-28 VAC.
- C.3.6.2.2 Lens shall be varifocal (image approval required).
- C.3.6.2.3 Exterior cameras shall have weatherproof housings.
- C.3.6.2.4 Operating temperature: -40°F to 122°F (outdoor units).
- C.3.6.2.5 Humidity: 0-90%, relative, non-condensing.
- C.3.6.2.6 Shall have an integrated fiber optic modem.
- C.3.6.2.7 Environmental Rating of IP66 or NEMA 4X certified
- C.3.6.2.8 Mounting
 - C.3.6.2.8.1 Stationary Cameras shall be capable of several mounting configurations: wall, ceiling, corner and surface. All cameras shall be mounted according to the manufacturer's specifications. Mounting shall be aesthetically pleasing and DDOT shall approve finish. All outdoor hardware shall be galvanized or coated with a weatherproof finish.

C.3.6.2.8.2 Exterior mounts shall be designed and installed so that the camera does not vibrate due to winds and is not obscured by snow accumulation.

C.3.6.3 Install Fixed Cameras according to manufacturer's recommendations and design drawings. Contractor shall provide all required cabling and ancillary hardware and components to professionally install fixed cameras as an integral part of the CIP System.

C.3.6.4 Each Fixed Camera shall be paid at the contract unit price. Payment shall include all labor, material, and all incidentals to complete the work described herein.

C.3.7 FURNISH AND INSTALL MPEG-4 VIDEO ENCODERS (CLIN 0007 AND ADDITIVE ALTERNATIVE CLIN 0047)

C.3.7.1 Special Provision Pay Item No. 630 20

C.3.7.2 Provide MPEG-4 encoders to convert the analog and serial data signals to Internet Protocol (IP) via an Ethernet interface to be transported over the LAN/WAN. The encoders shall have the following characteristics:

C.3.7.2.1 MPEG-4 compression; capable of dual simultaneous video streams at different resolutions, up to 4CIF settings.

C.3.7.2.2 UL listed.

C.3.7.2.3 120VAC power supply.

C.3.7.2.4 Compatible with the intelligent video software.

C.3.7.2.5 Rack mountable.

C.3.7.3 Install MPEG-4 Encoders according to manufacturer's recommendations and design drawings. Contractor shall provide all required cabling and ancillary hardware and components to professionally install MPEG-4 Encoders as an integral part of the CIP System.

C.3.7.4 Each MPEG-4 Encoders shall be paid at the contract unit price. Payment shall include all labor, material (including rack mountable shelves), and all incidentals to complete the work described herein.

C.3.8 FURNISH AND INSTALL UNINTERRUPTIBLE POWER SUPPLIES (UPS) (CLIN 0008 AND ADDITIVE ALTERNATIVE CLIN 0048)

C.3.8.1 Special Provision Pay Item No. 630 22

C.3.8.2 Provide UPS capable of providing a 15 minute back-up for all equipment installed in the communications cabinets and head end cabinets. The UPS(s) shall power from dedicated electrical circuits as described in the cabinet section of these Special Provisions. The UPSs shall have the following characteristics:

C.3.8.2.1 Provide conditioned power and surge protection to all equipment connected to it.

- C.3.8.2.2 UL listed.
- C.3.8.2.3 Provide 120VAC power output.
- C.3.8.2.4 Hardened operating temps (-20° F to 122° F) minimum.
- C.3.8.2.5 Rack mountable.

C.3.8.3 Install UPS according to manufacturer's recommendations and Design Drawings. Contractor shall provide all required cabling and ancillary hardware and components to professionally install UPS as an integral part of the CIP System.

C.3.8.4 Each UPS shall be paid at the contract unit price. Payment shall include all labor, material, and all incidentals to complete the work described herein.

C.3.9 FURNISH AND INSTALL ETHERNET MODEMS (CLIN 0009 AND ADDITIVE ALTERNATIVE CLIN 0049)

C.3.9.1 Special Provision Pay Item No. 630 24

C.3.9.2 Provide Ethernet modems and repeaters to transport the video signals and data from the communications cabinets at the TR Bridge and 3rd Street Tunnel to the TMC over DDOT's existing copper plant. The modems shall be located in the existing traffic cabinets (if space permits) at 3rd and D Streets NW for the Tunnel, 23rd and Constitution Avenue NW for the TR Bridge, and at the TMC CIP equipment cabinet.

C.3.9.3 We are anticipating 2 repeater sites for the TR Bridge:

- C.3.9.3.1 Cabinet #12 at 17th and Massachusetts Ave NW; and
- C.3.9.3.2 Cabinet #58 At 17th and D Streets NW.

C.3.9.4 We are anticipating 3 repeater sites for the tunnel:

- C.3.9.4.1 Cabinet #6 at S and 16th Streets NW;
- C.3.9.4.2 Cabinet #70 at I and 16th Streets NW; and
- C.3.9.4.3 Cabinet #47 at E and 11th Streets NW.

C.3.9.5 The Contractor shall provide and install extra repeaters if needed. The modems shall have the following characteristics:

- C.3.9.5.1 Provide 5.6 Mbps per copper cable pair for up to 8 pairs.
- C.3.9.5.2 UL listed.
- C.3.9.5.3 Powered by 120VAC circuit.
- C.3.9.5.4 Hardened operating temps (-40° F to 149° F) minimum
- C.3.9.5.5 Rack or surface mountable.
- C.3.9.5.6 10/100 BaseT network connection using RJ 45 connectors.

C.3.9.6 The Ethernet modem shall be installed in existing traffic cabinets space permitting. If space is not available the Contractor shall install a standard DDOT traffic cabinet and foundation next to the existing traffic cabinet and provide electrical conduit between both

cabinets. The existing cabinet shall provide electrical power and terminal connections to the DDOT copper plant. The Contractor shall provide over current/surge protection devices and ancillary cabling and termination equipment for the CIP equipment.

C.3.9.7 Install Ethernet Modems according to manufacturer's recommendations and Design Drawings. Contractor shall provide all required cabling and ancillary hardware and components to professionally install Ethernet Modems as an integral part of the CIP System.

C.3.9.8 Each Ethernet Modem shall be paid at the contract unit price. Payment shall include all labor, material, and all incidentals to complete the work described herein.

C.3.10 FURNISH AND INSTALL FIBER OPTIC MEDIA CONVERTERS (CLIN 0010 AND ADDITIVE ALTERNATIVE CLIN 0050)

C.3.10.1 Special Provision Pay Item No. 630 26

C.3.10.2 Provide Fiber Optic Video Media Converters provide analog video to MPEG-4 Encoders. The fiber optic link shall consist of two transceivers (one integrated in each camera, utilizing full duplex capabilities to transfer a video signal in one direction while simultaneously transmitting control data in the opposite direction). This bi-directional transmittance shall be by means of a single optical fiber. Provide patch panels, connectors, terminations, and mounting hardware as required.

C.3.10.3 Performance Requirements:

C.3.10.3.1 The link shall require no user adjustments.

C.3.10.3.2 The video segment of the link shall accept a baseband video signal that conforms to color (NTSC) signal standards.

C.3.10.3.3 The control portion of the link shall accept the balanced bi-phase digital control signal from simplex RS-232C or RS-422 level data.

C.3.10.3.4 The system shall utilize pulse wave modulation (PWM) for video transmission.

C.3.10.3.5 The system shall utilize frequency modulation (FM) for data transmission.

C.3.10.3.6 Simplex video and full duplex control fiber optic transceivers shall be furnished to transmit and receive the camera video and sync signals and to transmit and receive the pan/tilt and lens zoom control signals.

C.3.10.3.7 Transceivers shall operate at a wavelength of 1300 nanometers (nm).

C.3.10.4 Optical Specifications:

C.3.10.4.1 The link shall be capable of transmitting (between the transceivers) up to 1.2 miles (2 kilometers) using 62.5/125 micrometer (μm) low loss (less than 3.0 dB/km) fiber with fusion splices.

C.3.10.4.2 Optical fibers shall be multi-mode, graded index, solid glass waveguides. For long runs over 2 miles, single mode fiber shall be used.

C.3.10.5 Electrical Specifications:

- C.3.10.5.1 The system shall output a composite video input of 0.5 to 2.0 volts peak-to-peak, and produce a composite video signal at the system output which tracks the video input.
- C.3.10.5.2 The system shall accept a bi-phase control signal input of 0.5 to 3.0 volts peak-to-peak, and produce, at the system output, a bi-phase control signal output of 2.0 volts peak-to-peak.
- C.3.10.5.3 The output transceiver shall have the capability to drive one receiver/driver load at up to 5000 feet (1524 meters) using 18 AWG shielded twisted-pair.
- C.3.10.5.4 Power supplies shall accept 120 VAC.
- C.3.10.5.5 Nominal power dissipation per unit: 5 watts.

- C.3.10.6 Mechanical Specifications (per unit):
 - C.3.10.6.1 Optical: ST ceramic-type connector.
 - C.3.10.6.2 Video: BNC type.
 - C.3.10.6.3 Power/signal: Removable 4-contact screw connector.

- C.3.10.7 Environmental Specifications:
 - C.3.10.7.1 Operating temperature range: -40° to +74° C (-40° to +165° F).
 - C.3.10.7.2 Humidity rating: 0 to 95 percent relative, non-condensing.

C.3.10.8 Install Fiber Optic Video Media Converters according to manufacturer's recommendations and Design Drawings. Contractor shall provide all required cabling and ancillary hardware and components to professionally install Fiber Optic Video Media Converters as an integral part of the CIP System.

C.3.10.9 The Fiber Optic Video Media Converters shall be paid at the contract unit price for each. Payment shall include all labor, material (including rack mountable shelves), and all incidentals to complete the work described herein.

C.3.11 FURNISH AND INSTALL FIBER OPTIC TERMINATION PANELS (CLIN 0011 AND ADDITIVE ALTERNATIVE CLIN 0051)

- C.3.11.1 Special Provision Pay Item No. 630 28
- C.3.11.2 Provide Fiber Optic Termination Panels for fiber optic cable management and testing as shown in the Design Drawings. The panel shall:
 - C.3.11.2.1 Use a 48-port configuration.
 - C.3.11.2.2 Utilize ST style connectors.
 - C.3.11.2.3 Have changeable ports that are removed from the front of the panel to allow custom configuration or modification to the panel.
 - C.3.11.2.4 Be available with no ports to act as filler between rack hardware and equipment.
 - C.3.11.2.5 Have port identification numbers provided on the front panel.
 - C.3.11.2.6 Capable of mounting to standard 19" EIA/TIA rack system.

C.3.11.3 Install Fiber Optic Termination Panels according to manufacturer's recommendations and Design Drawings. Contractor shall provide all ancillary hardware and components to professionally install Fiber Optic Termination Panels as an integral part of the CIP System.

C.3.11.4 Each Fiber Optic Termination Panel shall be paid at the contract unit price. Payment shall include all labor, material, and all incidentals to complete the work described herein.

C.3.12 FURNISH AND INSTALL 12 STRAND MULTIMODE FIBER OPTIC CABLE (CLIN 0012 AND ADDITIVE ALTERNATIVE CLIN 0052)

C.3.12.1 Special Provision Pay Item No. 630 30

C.3.12.2 Provide, install, terminate and test indoor/outdoor multimode fiber optic cable. The cable shall contain 12 or 48 strands as indicated on Design Drawings. All splicing shall be in a termination panel; underground splicing in junction boxes is not acceptable. All fibers in the cable must be usable and meet required specifications. Each fiber shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification. Each optical fiber shall consist of doped silica core surrounded by a concentric glass cladding. The fiber shall be coated with a dual layer acrylate protective coating. The coating shall be in physical contact with the cladding surface.

C.3.12.3 Standards met:

C.3.12.3.1 ANSI/ICEA S-104-696

C.3.12.3.2 ANSI/ICEA S-87-640

C.3.12.3.3 TIA/EIA-568-B

C.3.12.3.4 Telcordia GR-409

C.3.12.4 Multimode Fiber Characteristics

C.3.12.4.1 Core Diameter: $62.5 \pm 3 \mu\text{m}$

C.3.12.4.2 Core Non-Circularity: $\leq 5\%$

C.3.12.4.3 Cladding Diameter: $125.0 \pm 2.0 \mu\text{m}$

C.3.12.4.4 Cladding Non-Circularity: $\leq 2\%$

C.3.12.4.5 Maximum Attenuation: 3.0 dB/km at 850 nm and 1.0 dB/km at 1300nm

C.3.12.5 Performance: IEEE 802.3 1000Base-SX/LX 1000Mb/s

C.3.12.6 Cable Sheath

C.3.12.6.1 Loose tube, all-dielectric cable

C.3.12.6.2 Plenum rated

C.3.12.6.3 Each buffer tube shall contain 12 strands of fiber

C.3.12.6.4 Fibers shall not adhere to the buffer tube

C.3.12.6.5 Buffer tube and fibers shall be color coded according to TIA/EIA-598-B

C.3.12.6.6 Utilize a non-gel type water blocking material

- C.3.12.6.7 Maximum outer diameter: 0.260 inches for the 12 strand cable
- C.3.12.6.8 Minimum bending radius: 12-strand is 4 inches or less; 48-strand is 6 inches or less

C.3.12.7 Testing - Submit testing documentation for Engineer's approval. After test documentation is approved, provide at least 10 working days notice prior to all tests to permit the Engineer to observe each test.

C.3.12.7.1 Upon completion of the cable installation, splicing, and termination, the Contractor must test all fibers for continuity, events above 0.20 dB, and total attenuation of the cable. The test procedure is as follows:

C.3.12.7.1.1 A Certified Technician utilizing an Optical Time Domain Reflectometer (OTDR) and Optical Source/Power Meter must conduct the installation test. The Technician is directed to conduct the test using the Standard Operating Procedure as defined by the manufacturer of the test equipment.

C.3.12.7.1.2 The method of connectivity between the OTDR and the cable must be a factory patch cord of a length equal to the "dead zone" of the OTDR. Optionally, the Technician can use a factory "fiber box" of 100 meters minimum with no splices within the box. The tests must be conducted at 850 and 1300 nm for all cable.

C.3.12.7.1.3 At the completion of the test, the Contractor must provide documentation of the test results to the Engineer. The test documentation must be bound and include the following:

- C.3.12.7.1.3 .1 Cable & Fiber Identification
- C.3.12.7.1.3 .2 Cable ID
- C.3.12.7.1.3 .3 Cable Location - begin and end point
- C.3.12.7.1.3 .4 Fiber ID, including tube and fiber color
- C.3.12.7.1.3 .5 Operator Name
- C.3.12.7.1.3 .6 Date & Time
- C.3.12.7.1.3 .7 Setup Parameters
- C.3.12.7.1.3 .8 Wavelength
- C.3.12.7.1.3 .9 Pulse width (OTDR)
- C.3.12.7.1.3 .10 Refractory index (OTDR)
- C.3.12.7.1.3 .11 Range (OTDR)
- C.3.12.7.1.3 .12 Scale (OTDR)
- C.3.12.7.1.3 .13 Test Results

C.3.12.7.2 OTDR Test results shall include:

- C.3.12.7.2.1 Total Fiber Trace
- C.3.12.7.2.2 Splice Loss/Gain
- C.3.12.7.2.3 Events > 0.10 dB
- C.3.12.7.2.4 Measured Length (Cable Marking)
- C.3.12.7.2.5 Total Length as measured by the OTDR.

C.3.12.7.2.6 No event must exceed 0.20 dB. If any event is detected above 0.20dB, the Contractor must replace or repair that event point.

C.3.12.7.2.7 Traces must also be provided on a CD in PDF format

C.3.12.7.3 Optical Source/Power Meter Test results shall include:

C.3.12.7.3.1 Total Attenuation The total dB loss of the cable, less events, must not exceed the manufacturer's production specifications. If the total loss exceeds these specifications, the Contractor must replace or repair that cable run at the Contractor's expense, both labor and materials.

C.3.12.7.3.2 Attenuation (dB/km) does not exceed +3% of the factory cable test or 1% of the cables published production loss. The error rate for the test equipment shall be taken into account.

C.3.12.7.3.3 These results must be provided in tabular form and must be met for the cable to be accepted

C.3.12.8 Install Multimode Fiber Optic Cables according to manufacturer's recommendations and Design Drawings. Contractor shall provide all labor, materials, equipment ancillary hardware to professionally install, fusion splice, terminate and test all Multimode Fiber Optic Cables as an integral part of the CIP System.

C.3.13 FURNISH AND INSTALL 48 STRAND MULTIMODE FIBER OPTIC CABLE (CLIN 0013)

C.3.13.1 Special Provision Pay Item No. 630 32

C.3.13.2 Refer to C.3.12 for. All requirements are the same with the exception of the fiber count.

C.3.14 FURNISH AND INSTALL FIBER OPTIC PATCH CABLES (CLIN 0014 AND ADDITIVE ALTERNATIVE CLIN 0053)

C.3.14.1 Special Provision Pay Item No. 630 34

C.3.14.2 Provide Fiber optic patch cables to connect Fiber Optic Video Media Converters to the Fiber Optic Termination Panels. Each Fiber Optic Patch Cable shall be multimode 62.5/125 μ m, with ST style connectors. The optical characteristics are described in section C.12.

C.3.14.2.1 Factory terminated ST style connectors.

C.3.14.2.2 Simplex or Duplex cables.

C.3.14.2.3 Shall be 1 meter in length max, unless otherwise noted.

C.3.14.3 Install Fiber Optic Patch Cables according to manufacturer's recommendations and Design Drawings. Contractor shall professionally install Fiber Optic Patch Cables as an integral part of the CIP System.

C.3.14.4 Each Fiber Optic Patch Cable shall be paid at the contract unit price. Payment shall include all labor, material, and all incidentals to complete the work described herein.

C.3.15 FURNISH AND INSTALL HYBRID CABLES (CLIN 0015 AND ADDITIVE ALTERNATIVE CLIN 0054)

C.3.15.1 Special Provision Pay Item No. 630 36

C.3.15.2 Provide Hybrid Cables consisting of one (1) simplex or duplex multimode fiber cable and three (3) #12 AWG conductors to connect each camera to its respective camera box, remote rail mounted equipment cabinet or communications cabinet. Each simplex/duplex cable shall be multimode 62.5/125µm, with ST style connectors. The optical characteristics are described in section C.12.

C.3.15.2.1 Factory terminated ST style connectors.

C.3.15.2.2 Simplex or Duplex cables.

C.3.15.2.3 Shall be 1 meter in length max, unless otherwise noted.

C.3.15.3 The #12 conductors shall have 600V, THWN insulation. The Contractor can provide the cables can be assembly or individual and install them as an assembly. Install Hybrid Cables according to recommendations provided in the Multimode Fiber Optic Cable section of these Special Provisions and Design Drawings. All splicing shall be fusion, mechanical splices are unacceptable. Contractor shall professionally install, connect and test Hybrid Cables as an integral part of the CIP System.

C.3.15.4 The unit of measure for the Hybrid Cables shall be Linear foot. Payment shall include all labor, material, splicing, testing and all incidentals to complete the work described herein.

C.3.16 LANDSCAPE WORK AND RESTORATION (ADDITIVE ALTERNATIVE CLIN 0055)

C.3.16.1 Special Provision Pay Item No. 630 38

C.3.16.2 The Contractor is responsible for restoration of all landscape damage during construction. All surfaces shall be restored to pre-construction conditions, any shrubbery or trees damaged shall be replaced in kind at the Contractors expense. The Contractor shall also trim trees as needed to provide camera views only with approval from DDOT, Urban Forestry Administration and the National Park Service.

C.3.16.3 The unit of measure for Landscape and Restoration shall be Lump Sum. Payment shall include all labor, material, and equipment to complete the work described herein.

C.3.17 INTELLIGENT VIDEO DETECTION SYSTEM (CLIN 0016 AND ADDITIVE ALTERNATIVE CLIN 0056)

C.3.17.1 Special Provision Pay Item No. 630 40

C.3.17.2 This item shall include the furnishing, installation and integration of a new Intelligent Video Detection System for the DDOT Critical Infrastructure Protection Project (CIP) system. The Intelligent Video Detection System shall be an open architecture software product that shall be integrated with the proposed Video Surveillance System. For the purposes of this project, the system shall be designed for detection at the 3rd Street Tunnel, and shall be scalable to integrate other DDOT facilities in the future, including the TR Bridge Additive Alternative. The system shall provide automated detection alarms, alarm logs and camera cue-ups.

C.3.17.3 The intelligent video software is the key component of the Intelligent Video Detection System. The software shall provide user-defined analytics for detection as well as system control and image recording. The software shall not require any specialized equipment; it shall utilize standard Commercial-Off-the-Shelf (COTS) network and surveillance equipment as described herein. The software shall be capable of running on a Microsoft Windows operating system using an applications and control "type" server(s) platform and be industry-proven security software capable of automatically detecting user-definable objects and complex patterns of behavior in a scene. The software shall have forensic capabilities to analyze archived video. The software shall manage servers at multiple sites over the WAN as shown/described in the Design Drawings, Video Surveillance System specification and herein.

C.3.17.4 The intelligent video software shall be installed locally at the 3rd St Tunnel as shown on the Design Drawings. These servers shall provide detection for their respective facilities and shall be managed by application servers at the DDOT Traffic Management Center (TMC). Each Intelligent Video Server shall be allocated eight (8) cameras (video streams) to analyze and record. Each Intelligent Video Server shall be capable of applying a minimum of five (5) detection rules for each camera/video stream and continuously/simultaneously monitor and alarm if any of the rule are violated.

C.3.17.5 The Intelligent Video Detection System shall be capable of utilizing PTZ cameras by defining regions of interest (ROI) in the view, in the same manner as with a fixed camera. In this manner, PTZ cameras can be utilized to replace fixed cameras, one for one, on an individual location basis.

C.3.17.6 The Intelligent Video Detection System shall detect incidents and identify potential security threats through the use of analytic software. The System shall reduce the need for control center employees to actively and simultaneously monitor an extensive system of video feeds by emulating a person's judgment for distinguishing what denotes an alarm

situation. The intelligent video detection software shall meet the following functional requirements:

C.3.17.6.1 The software shall have the ability to define rules concerning motion, to include at a minimum, motion detection, static object detection, path detection, presence detection, directional motion, object started, object removal, speed, and loitering.

C.3.17.6.2 The software shall have the ability to analyze any type of image applicable to CIP.

C.3.17.6.3 The software shall have the ability to automatically trigger audible and visual alarms.

C.3.17.6.4 The software shall have the ability to store images that trigger alarms to support evaluation and system reconfiguration for improved results.

C.3.17.6.5 The software shall have the ability to provide a log of all alarms.

C.3.17.6.6 The software shall detect objects left in a protected area. The software shall detect objects as small as a suit case. The protected areas shall include roadways, walkways and areas around vital structural members.

C.3.17.6.7 The software shall detect stopped vehicle or vehicle in a restricted area. Detection of stopped vehicles in roadways shall be modified by schedule or detection time to minimize false alarms during rush hour traffic queues. Overhead doors and driveways are to be considered restricted areas for stopped vehicles.

C.3.17.6.8 The software shall detect stopped watercraft(s) within the view of the detection camera(s) around structural members.

C.3.17.6.9 The software shall detect people in restricted areas. Pedestrian and overhead doors and tunnel walkways shall be considered restricted areas.

C.3.17.6.10 The software shall be capable of programming adjustable guard boundaries (or regions of interest (ROI)) using virtual trip wires to protect vulnerable areas of DDOT property from unauthorized access and unattended objects. The Contractor shall develop specific ROIs for each camera view, apply detection rules which will require DDOT's approval.

C.3.17.6.11 The software shall provide the ability to automatically index, catalogue, and archive all incidents for examination.

C.3.17.6.12 The software shall provide the ability to include watermarks on all images to prove authenticity.

C.3.17.6.13 The software, once programmed, shall provide automatic alarm detection.

C.3.17.6.14 The software shall provide the ability to archive real-time data with evidential quality.

C.3.17.6.15 The software shall provide the ability to generate custom reports such as Crystal Reports. The Contractor shall coordinate with DDOT and HSEMA and develop custom weekly and monthly reports. The reports shall be capable of documenting at a minimum incident; incident ID (sequential number); incident date and time; operator acknowledgement; operator ID; acknowledgement time and date; operator response and supervisor ID. The report fields shall be user definable and the Contractor is responsible for developing the format which shall require DDOT and HSEMA approvals.

C.3.17.6.16 The software shall operate on standard COTS IP-based networks and with COTS surveillance equipment.

C.3.17.6.17 The software shall detect loss of camera signal or picture.

C.3.17.6.18 The software shall operate on a Microsoft Windows operating system running on a server platform configured as an application server.

C.3.17.6.19 The software shall provide central management of edge servers at all CIP sites over the WAN.

C.3.17.6.20 The software shall use an SQL compliant database and queries to quickly search through large amounts of video data. The database information shall be capable of import/export to standard Microsoft applications

C.3.17.6.21 The software shall be compatible with latest Microsoft Server, XP and Vista operating systems.

C.3.17.6.22 The software shall utilize multiple video compression techniques including, without limitation, MPEG-4.

C.3.17.6.23 The software shall have NVR functionality for recording and storage. If the detection software does not have this functionality then NVR software must be provided as part of the CLIN. Refer to Server CLIN for storage requirements.

C.3.17.6.24 The software shall provide the capability for sending alarm notifications via email, PDA and pager.

C.3.17.6.25 The software shall provide the capability for monitoring access control and environmental systems. The software shall be provided with a Software Development Kit (SDK) for development of interoperability between the CIP other systems.

C.3.17.6.26 The software shall provide the capability for system access through third party communications, command, control and intelligence systems.

C.3.17.6.27 The software shall not require any specialized equipment.

C.3.17.6.28 The software shall be industry-proven.

C.3.17.6.29 The software shall provide a client user interface which supports definition of analytics and rules for detection, system control and control of image recording and playback.

C.3.17.6.30 The software shall have the ability to categorize objects.

C.3.17.6.31 The software shall be able to identify important image characteristics such as recognizing human beings as opposed to animals, etc.

C.3.17.7 In addition, the following capabilities are not required as part of this initial system, but the system must be capable of supporting these functions in the future:

C.3.17.7.1 Graffiti and vandalism detection.

C.3.17.7.2 Integration with license plate recognition / database.

C.3.17.8 The Intelligent Video Detection System is required to be fully compatible with the other systems and equipment selected for this project, and shall include the following functionality:

C.3.17.8.1 Integrates with proposed video surveillance and alarm systems.

C.3.17.8.2 Provides auto-tracking for cameras.

C.3.17.9 In addition, the following capabilities are not required as part of this initial system, but the system must be capable of supporting these functions in the future:

C.3.17.9.1 Integrates with legacy analog CCTV and Alarm systems.

C.3.17.9.2 Capable of detecting color with color cameras.

C.3.17.10 HSEMA shall serve as the primary control center and the TMC in the Reeve's building shall serve as the secondary control center for the CIP system. The video detection head-end equipment shall connect to HSEMA via an HSEMA provided WAN and the TMC LAN, which shall provide access to the operator workstations. Access to other agency facilities and video surveillance equipment shall be made at the TMC equipment room.

C.3.17.11 Refer to section C.3.1 for server requirements.

C.3.17.12 Cameras are generally placed to view 200 foot sections of roadway. If the proposed Intelligent Video Detection System requires more cameras or servers to meet the described detection criteria in this section, then the Contractor must include the additional hardware, cameras, cabling, and related components with quantities specified in the pricing table for each CLIN in their proposal.

C.3.17.13 As stated in Video Surveillance System section, the Contractor is responsible for providing a stable image.

C.3.17.14 The system performance is highly dependent on camera angles and views so as to not adversely affect the performance of the Intelligent Video Detection System the Contractor shall be responsible for setting the camera view to provide a system performance of:

C.3.17.14.1 False alarm rate of 10%,

C.3.17.14.2 Missed alarm rate of 2%

C.3.17.14.3 Detection latency of 500ms.

C.3.17.14.4 System loading; the detection software shall be capable handling alarms from all cameras simultaneously without system disruption.

C.3.17.15 Install the Intelligent Video Detection System according to manufacturer's recommendations and Design Drawings. Contractor shall provide all labor, materials, equipment professionally install and test the Intelligent Video Detection System as an integral part of the CIP System.

C.3.17.16 Training on CIP System operation.

C.3.17.16.1 The Contractor and equipment manufacturers will provide a training program for control center staff and DDOT employees. The training will encompass familiarization with control center operations, field equipment and the communication system WAN and LANs. Both classroom and hands-on training will be provided with all documentation.

C.3.17.16.2 The training plan shall include, without limitation, descriptions of lesson plans, student handouts, visual aids, manuals and all other material being used to conduct each

training session. All training aids, except projectors and standard office equipment, shall become the property of DDOT upon the completion of the course.

C.3.17.16.3 The training classes will be conducted at DDOT-designated facility. All materials and equipment shall be shipped and set up at this site. Equipment used in the training shall be the same as what will be installed in the field. The training objectives should include, without limitation, the following:

C.3.17.16.3.1 Familiarize trainees with CIP system architecture and operating principles.

C.3.17.16.3.2 Familiarize trainees with the intelligent video software management system and Graphical User Interface (GUI).

C.3.17.16.3.3 Trainees should understand how to manipulate the intelligent video detection parameters while online.

C.3.17.16.3.4 Trainees should understand how the system is installed and locations of devices.

C.3.17.16.3.5 Training should include, without limitation, mock system failures to familiarize trainees with troubleshooting.

C.3.17.16.3.6 Training should also include, without limitation, mock emergency tabletop exercises which should include, without limitation, actual site alarming and procedures to aide in response preparedness.

C.3.17.16.4 Training will be organized into two (2) sessions; the first will be the initial training and will consist of lectures and "Hands-On" classes prior to completion of the system for up to 20 personnel designated by DDOT through coordination with HSEMA. The second shall be a refresher course held after successful completion of the 60-Day system operations test, or a time period chosen by DDOT.

C.3.17.16.5 Lecture material shall consist of hard copy manuals, and power point presentation with handouts and all hard copy documentation shall be supplied in softcopy as well.

C.3.17.17 The unit of measure for the Intelligent Video Detection System pay item shall be Lump Sum. Payment shall include all labor, material, training of DDOT designated personnel and all incidentals to complete the work described herein.

C.3.18 MINOR ELECTRICAL DEMOLITION (CLIN 0017)

C.3.18.1 Special Provision Pay Item No. 630 44

C.3.18.2 Section Includes:

C.3.18.2.1 Removal of existing CCTV equipment, wiring, and conduit in areas designated by DDOT; removal of designated construction; dismantling, cutting and alterations for completion of the Work.

C.3.18.2.2 Disposal of materials.

C.3.18.2.3 Storage of removed materials.

C.3.18.2.4 Identification of utilities.

- C.3.18.2.5 Salvaged items.
- C.3.18.2.6 Protection of items to remain as scheduled at end of section as indicated on Design Drawings.
- C.3.18.2.7 Relocate existing equipment to accommodate construction.

- C.3.18.3 Comply with the requirements of DDOT Standard Specifications – Division 100.
- C.3.18.3.1 Conduct demolition to minimize interference with adjacent and occupied building areas.
- C.3.18.3.2 Coordinate demolition work with DDOT.
- C.3.18.3.3 Coordinate and sequence demolition so as not to cause shutdown of operation of surrounding areas.

- C.3.18.4 Erect, and maintain temporary safeguards, including warning signs and lights, barricades, and similar measures, for protection of the public, DDOT, Contractor's employees, and existing improvements to remain.

- C.3.18.5 Temporary egress signage and emergency lighting

- C.3.18.6 Demolition Drawings are based on casual field observation and existing record documents. Report discrepancies to Project Engineer before disturbing existing installation.

- C.3.18.7 Remove exposed abandoned conduit.

- C.3.18.8 Remove conduit, wire, boxes, and fastening devices to avoid any interference with new installation.

- C.3.18.9 Disconnect existing electrical systems.

- C.3.18.10 Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, and related switches, outlets, conduit and wiring which are not part of final project

- C.3.18.11 Install temporary wiring and connections to maintain existing systems in service during construction.

- C.3.18.12 Perform work on energized equipment or circuits with experienced and trained personnel.

- C.3.18.13 Remove, relocate, and extend existing installations to accommodate new construction.

- C.3.18.14 Repair adjacent construction and finishes damaged during demolition and extension work.

C.3.18.15 Remove exposed abandoned grounding and bonding components, fasteners and supports, and electrical identification components, including abandoned components above accessible ceiling finishes. Cut embedded support elements flush with walls and floors.

C.3.18.16 Clean and repair existing equipment to remain or to be reinstalled.

C.3.18.17 Protect and retain power to existing active equipment remaining.

C.3.18.18 Cap abandoned empty conduit at both ends.

C.3.18.19 Perform Work in accordance with applicable codes and regulations.

C.3.18.20 SALVAGE ITEMS. Remove and protect items to be salvaged and turn over to DDOT.

C.3.18.20.1 Items of salvageable value may be removed as work progresses. Transport salvaged items from site as they are removed to DDOT. The Contractor shall contact Mr. James Henry at (202) 698-3677; 72 hours in advance of delivering salvage material to 1725 Fenwick Street, NE.

C.3.18.21 The unit of measure for the Minor Electrical Demolition pay item shall be Lump Sum. Payment shall include all labor, equipment all incidentals to complete the work described herein.

C.3.19 FURNISH AND INSTALL # 2 THWN COPPER CONDUCTORS (ADDITIVE ALTERNATIVE CLIN 0057)

C.3.19.1 Special Provision Pay Item No. 630 46

C.3.19.2 Provide #2 THWN Copper Conductors as shown on the Design Drawings to provide power the CIP equipment.

C.3.19.3 Comply with DDOT Standard Specifications – Sections 100, 621, 820 and as follows:

C.3.19.3.1 This section includes building wire and cable; nonmetallic-sheathed cable; direct burial cable; service entrance cable; armored cable; metal clad cable; and wiring connectors and connections.

C.3.19.4 Provide insulated conductor(s) in accordance with DDOT Standard Specifications – Section 820.11 and electric service conductors in accordance with Pepco Design Requirements.

C.3.19.5 Conductor sizes are based on copper.

- C.3.19.6 Comply with DDOT Standard Specifications – Section 105.
- C.3.19.6.1 Product Data: Submit for building wire and each cable assembly type.
- C.3.19.7 Coordination. Comply with the requirements of DDOT Standard Specifications – Division 100.
- C.3.19.8 Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.
- C.3.19.9 Wire and cable routing indicated is approximate unless dimensioned. Include wire and cable lengths within 10 ft of length shown.
- C.3.19.10 Materials. Comply with DDOT Standard Specifications – Section 820.11 and with Pepco Design Requirements for electric service conductors.
- C.3.19.11 Install electrical conductors according to applicable codes and Design Drawings
- C.3.19.12 Comply with DDOT Standard Specifications – Section 618.20 and 618.22 and include:
 - C.3.19.12.1 Route wire and cable to meet Project conditions.
 - C.3.19.12.2 Neatly train and lace wiring inside boxes, equipment, and panelboards.
 - C.3.19.12.3 Identify and color code wire and cable under provisions of DDOT Standard Specifications – Sections 621.13, 820.11, and 820.14. Identify each conductor with its circuit number or other designation indicated.
- C.3.19.13 Special Techniques--Building Wire in Raceway:
 - C.3.19.13.1 Pull conductors into raceway at same time.
 - C.3.19.13.2 Install building wire 4 AWG and larger with pulling equipment.
- C.3.19.14 Special Techniques - Cable:
 - C.3.19.14.1 Protect exposed cable from damage.
 - C.3.19.14.2 Use suitable cable fittings and connectors.
- C.3.19.15 Special Techniques - Wiring Connections:
 - C.3.19.15.1 Clean conductor surfaces before installing lugs and connectors.
 - C.3.19.15.2 Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
 - C.3.19.15.3 Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
 - C.3.19.15.4 Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
 - C.3.19.15.5 Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
 - C.3.19.15.6 Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

C.3.19.16 Install stranded conductors for branch circuits 12 AWG and smaller. However, when stranded conductors are used in lieu of solid, then install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

C.3.19.17 Wire color. Comply with DDOT Standard Specifications – Section 820.11(E).

C.3.19.18 Comply with DDOT Standard Specifications – Section 621.16.

C.3.19.18.1 Inspect and test in accordance with NETA ATS.

C.3.19.18.2 Perform inspections and tests listed in NETA ATS

C.3.19.19 The unit of measure for #2 and #6 AWG THWN copper conductors is Linear Foot. Installation, connectors, taps and terminations are considered incidental to these Items. Payment shall include all labor, material, terminate, test and all incidentals to complete the work described herein.

C.3.20 FURNISH AND INSTALL # 6 THWN COPPER CONDUCTORS (CLIN 0018)

C.3.20.1 Special Provision Pay Item No. 630 48

C.3.20.2 Provide #6 THWN Copper Conductors as shown on the Design Drawings to provide power the CIP equipment.

C.3.20.2 Refer to section C.3.19 for conductor requirements.

C.3.21 FURNISH AND INSTALL 1" GALVANIZED RIGID STEEL CONDUIT (CLIN 0019 AND ADDITIVE ALTERNATIVE CLIN 0058)

C.3.21.1 Special Provision Pay Item No. 630 50

C.3.21.2 Provide and install conduit, junction boxes, handholes as indicated on Design Drawings. This section includes conduit and tubing, surface raceways, wireways, outlet boxes.

C.3.21.3 Comply with DDOT Standard Specifications – Sections 621 and 820.

C.3.21.4 Raceway and boxes located as indicated on Design Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

C.3.21.5 Delivery, Storage, and Handling. Comply with DDOT Standard Specifications – Sections 106.07 and 106.08 and include:

C.3.21.5.1 Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C.3.21.5.2 Protect PVC conduit from sunlight.

C.3.21.6 Coordination. Comply with the requirements of DDOT Standard Specifications – Division 100.

C.3.21.6.1 Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

C.3.21.7 Materials. Comply with DDOT Standard Specifications – Sections 621.09, 820.12 and include:

C.3.21.7.1 Provide 1” and 2” Galvanized Rigid Steel Conduit as shown in the Design Drawings and described herein. Transitions, fittings, couplings, expansion joints and elbows shall be from the same manufacturer.

C.3.21.8 Installation. Comply with DDOT Standard Specifications – Section 618 and include:

C.3.21.8.1 It is the Contractors responsibility to locate all existing underground infrastructure (such as conduit, pipe, cabling, gas mains, etc.) and contacting “Miss Utility”. The Contractor is responsible for any damage to existing underground facilities during construction and repairs shall be made at the Contractor’s expense.

C.3.21.8.2 Contractor shall use care when drilling or coring decorative façade. Any surfaces damaged by construction such as stone, granite, ceramic tile, etc. shall be repaired in kind at the Contractor’s expense.

C.3.21.8.3 Ground and bond all metallic raceways and boxes.

C.3.21.8.4 Identify raceway and boxes.

C.3.21.8.5 Arrange raceway and boxes to maintain headroom and present neat appearance.

C.3.21.8.6 Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.

C.3.21.8.7 Arrange raceway supports to prevent misalignment during wiring installation.

C.3.21.8.8 Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers as indicated on Design Drawings.

C.3.21.8.9 Group related raceway; support using conduit rack. Construct rack using steel channel specified in the Electrical Hangars and Supports section of these Special Provisions; use existing conduit supports where available.

C.3.21.8.10 Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports.

C.3.21.8.11 Do not attach raceway to ceiling support wires, piping systems, or mount conduit directly to ceiling panels.

C.3.21.8.12 Construct wireway supports from steel channel specified in 2008-CIP-16070.

C.3.21.8.13 Route exposed raceway parallel and perpendicular to walls.

C.3.21.8.14 Route raceway installed above accessible ceilings parallel and perpendicular to walls.

C.3.21.8.15 Route conduit in and under slab from point-to-point.

C.3.21.8.16 Maximum Size Conduit in Slab Above Grade: 3/4 inch do not cross conduits in slab.

- C.3.21.8.17 Maintain clearance between raceway and piping for maintenance purposes.
- C.3.21.8.18 Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 °F.
- C.3.21.8.19 Cut conduit square using saw or pipe cutter; de-burr cut ends.
- C.3.21.8.20 Bring conduit to shoulder of fittings; fasten securely.
- C.3.21.8.21 Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for minimum 20 minutes.
- C.3.21.8.22 Install conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- C.3.21.8.23 Install no more than equivalent of two 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install factory elbows for bends in metal conduit larger than 2 inch size.
- C.3.21.8.24 Avoid moisture traps; install junction box with drain fitting at low points in conduit system.
- C.3.21.8.25 Install fittings to accommodate expansion and deflection where raceway crosses seismic, control and expansion joints as well as long conduit runs; expansion joint placement per NEC.
- C.3.21.8.26 Install suitable pull string or cord in each empty raceway except sleeves and nipples.
- C.3.21.8.27 Install suitable caps to protect installed conduit against entrance of dirt and moisture.
- C.3.21.8.28 Close ends and unused openings in wireway.

C.3.21.9 Installation - Boxes

- C.3.21.9.1 Comply with DDOT Standard Specifications – Section 621 and include:
- C.3.21.9.2 Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Design Drawings.
- C.3.21.9.3 Do not fasten boxes to ceiling support wires, piping systems, or mount directly to ceiling panels.
- C.3.21.9.4 Support boxes independently of conduit.
- C.3.21.9.5 Install gang box where more than one device is mounted together. Do not use sectional boxes.

C.3.21.10 Conduit, tubing and raceways shall be paid per linear foot; conduit transitions, elbows, adapters; expansion joints, electrical boxes and couplings shall be considered incidental to the project.

C.3.22 FURNISH AND INSTALL 2" GALVANIZED RIGID STEEL CONDUIT (CLIN 0020 AND ADDITIVE ALTERNATIVE CLIN 0059)

- C.3.22.1 Special Provision Pay Item No. 630 52

C.3.22.2 Provide and install conduit, junction boxes, handholes as indicated on Design Drawings. This section includes conduit and tubing, surface raceways, wireways, outlet boxes.

C.3.22.3 Refer to section C.3.21 for conduit requirements.

C.3.23 FURNISH AND INSTALL ½" LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (CLIN 0021 AND ADDITIVE ALTERNATIVE CLIN 0060)

C.3.23.1 Special Provision Pay Item No. 630 54

C.3.23.2 Provide ½" Liquid Tight Flexible Metallic Conduit as shown in the Design Drawings and described herein. The conduit shall be constructed of interlocked steel with a PVC jacket. Transitions, fittings, expansion joints and couplings shall be from the same manufacturer and shall be in accordance with ANSI/NEMA FB 1-2007.

C.3.23.3 Refer to section C.3.21 for conduit requirements.

C.3.24 FURNISH AND INSTALL 1" PHENOLIC FIBERGLASS REINFORCED EPOXY (FRE) CONDUIT (CLIN 0022)

C.3.24.1 Special Provision Pay Item No. 630 56

C.3.24.2 Provide 1" Phenolic FRE Conduit as shown in the Design Drawings and described herein.

C.3.24.3 The FRE conduit used in the 3rd Street Tunnel shall be manufactured using a phenolic resin system for low smoke/high temperature applications. Transitions, fittings, couplings, expansion joints and elbows shall be from the same manufacturer. The conduit shall have the following characteristics:

C.3.24.3.1 Temperature range -40° F to 525° F.

C.3.24.3.2 Contain less than 0.2% Halogens by weight.

C.3.24.3 Refer to section C.3.21 for conduit requirements.

C.3.25 FURNISH AND INSTALL 2" PHENOLIC FIBERGLASS REINFORCED EPOXY (FRE) CONDUIT (CLIN 0023)

C.3.25.1 Special Provision Pay Item No. 630 58

C.3.25.2 Provide 2" Phenolic FRE Conduit as shown in the Design Drawings and described herein.

C.3.25.3 The FRE conduit used in the 3rd Street Tunnel shall be manufactured using a phenolic resin system for low smoke/high temperature applications. Transitions, fittings,

couplings, expansion joints and elbows shall be from the same manufacturer. The conduit shall have the following characteristics:

C.3.25.3.1 Temperature range -40° F to 525° F.

C.3.25.3.2 Contain less than 0.2% Halogens by weight.

C.3.25.4 Refer to section C.3.21 for conduit requirements.

C.3.26 FURNISH AND INSTALL 2" EXTRA HEAVY WALL (XHW) FIBERGLASS REINFORCED EPOXY (FRE) CONDUIT (ADDITIVE ALTERNATIVE CLIN 0061)

C.3.26.1 Special Provision Pay Item No. 630 60

C.3.26.2 Provide 2" XHW FRE Conduit as shown in the Design Drawings and described herein. Transitions, fittings, couplings, expansion joints and elbows shall be from the same manufacturer.

C.3.26.2 XHW Fiberglass Reinforced Epoxy (FRE).

C.3.26.2.1 The FRE conduit used on the TR Bridge shall be extra heavy wall (XHW) FRE conduit as indicated on the Design Drawings. The conduit shall have the following characteristics:

C.3.26.2.1.1 Temperature range -40° F to 525° F.

C.3.26.2.1.2 Conduit wall shall be 0.25 inches thick.

C.3.26.2.1.3 All conduit, fittings, adapters and elbows shall gray in color.

C.3.26.3 Refer to section C.3.21 for conduit requirements.

C.3.27 FURNISH AND INSTALL 2" SCHEDULE 80 PVC CONDUIT (CONCRETE ENCASED CLIN 0024 AND ADDITIVE ALTERNATIVE CLIN 0062)

C.3.27.1 Special Provision Pay Item No. 630 62

C.3.27.2 Provide 2" Schedule 80 Conduit as shown in the Design Drawings and described herein. Transitions, fittings, couplings, and elbows shall be from the same manufacturer. Conduits containing electrical conductors shall have the proper UL listing.

C.3.27.3 The Contractor is to install the conduit in concrete encasement as per DDOT Standard Specification 618.12. The installation, trenching in grass or street, concrete encasement and restoration of surface shall be incidental.

C.3.27.4 Refer to section C.3.21 for conduit requirements.

C.3.28 FURNISH AND INSTALL 2" SCHEDULE 80 PVC CONDUIT (BORED) (ADDITIVE ALTERNATIVE CLIN 0063)

C.3.28.1 Special Provision Pay Item No. 630 64

C.3.28.2 Provide 2" Schedule 80 Conduit as shown in the Design Drawings and described herein. Transitions, fittings, couplings, and elbows shall be from the same manufacturer. Conduits containing electrical conductors shall have the proper UL listing.

C.3.28.3 The Contractor is to install the conduit underground using Horizontal Direction Drilling method as per DDOT Standard Specification 618.13.

C.3.28.4 Refer to section C.3.21 for conduit requirements.

C.3.29 ROD AND CLEAN DISTRICT- OWNED CONDUIT (CLIN 0025 AND ADDITIVE ALTERNATIVE CLIN 0064)

C.3.29.1 Special Provision Pay Item No. 630 65

C.3.29.2 In accordance with DDOT Standard Specification 618.14.

C.3.30 FURNISH AND INSTALL HAND BOX (ADDITIVE ALTERNATIVE CLIN 0065)

C.3.30.1 Special Provision Pay Item No. 630 66

C.3.30.2 Provide Standard DDOT Traffic Signal Hand Box as specified in DDOT Drawing No. 617.21 as shown in the Design Drawings and described herein.

C.3.30.3 The Hand Box shall consist of pre-cast concrete. The concrete shall satisfy DDOT Specification 803.01 (3500 psi).

C.3.30.4 Install Hand Boxes in the locations specified on the Design Drawings. The Hand Boxes are to be used solely for pulling electrical conductors, not Fiber optic cable. It is the Contractor's responsibility to locate all existing underground infrastructure (such as conduit, pipe, cabling, gas mains, etc.) and contacting "Miss Utility". The Contractor is responsible for any damage to existing underground facilities during construction and repairs shall be made at the Contractor's expense.

C.3.30.5 Each Hand Box shall be paid at the contract unit price. Payment shall include all labor, material, equipment needed to install and all incidentals to complete the work described herein.

C.3.31 FURNISH AND INSTALL PULL BOX (CLIN 0026 AND ADDITIVE ALTERNATIVE CLIN 0066)

C.3.31.1 Special Provision Pay Item No. 630 68

C.3.31.2 Provide Standard DDOT Traffic Signal Pull Box as specified in DDOT Drawing No. 617.20 as shown in the Design Drawings and described herein.

C.3.31.3 The Pull Box shall consist of pre-cast concrete. The concrete shall satisfy DDOT Specification 803.01 (3500 psi).

C.3.31.4 Install Pull Boxes in the locations specified on the Design Drawings. The Pull Boxes are to be used for pulling and storing slack of fiber optic cable. In some locations Hybrid Cables are routed through Pull Boxes. It is the Contractors responsibility to locate all existing underground infrastructure (such as conduit, pipe, cabling, gas mains, etc.) and contacting "Miss Utility". The Contractor is responsible for any damage to existing underground facilities during construction and repairs shall be made at the Contractor's expense.

C.3.31.5 Each Pull Box shall be paid at the contract unit price. Payment shall include all labor, material, equipment needed to install and all incidentals to complete the work described herein.

C.3.32 FURNISH AND INSTALL REMOTE RAIL MOUNTED EQUIPMENT CABINETS (ADDITIVE ALTERNATIVE CLIN 0067)

C.3.32.1 Special Provision Pay Item No. 630 70

C.3.32.2 Provide Remote Rail Mounted Equipment Cabinets as indicated in the TR Bridge Design Drawings and herein.

C.3.32.3 TR Bridge shall be rated NEMA 3R enclosure, or as indicated on Design Drawings. The remote rail mounted equipment cabinet shall be a custom fabricated cabinet as described in the Design Drawings. The Contractor shall field verify dimensions before fabrication.

C.3.32.4 Covers: Continuous hinge, held closed by tamper-resistant security screws and lockable.

C.3.32.5 Furnish interior panel for mounting terminal blocks and electrical components.

C.3.32.6 Cabinets shall be complete, ready for installation pre-wired with transformers, terminal blocks, over-current protection devices, surge protection devices and fiber optic connectors. The Cabinets shall be keyed to DDOT's keying system. Cabinets shall be assembled by a UL Certified electrical shop.

C.3.32.7 Enclosure Finish: enclosures for the Theodore Roosevelt Bridge to match existing railing and light pole finish.

C.3.32.8 Install cabinets according to manufacturer's recommendations and as indicated on the Design Drawings. Contractor shall provide all required cabling, mounting hardware and

ancillary components to professionally install and connect Remote Rail Mounted Equipment Cabinets as an integral part of the CIP System.

C.3.32.9 Comply with DDOT Standard Specifications – Section 621.02.

C.3.32.10 Submittals. Comply with DDOT Standard Specifications – Section 105 and include:

C.3.32.10.1 Product Data: Submit manufacturer's standard data for enclosures, cabinets, and terminal blocks.

C.3.32.10.2 Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C.3.32.11 Install enclosures and boxes plumb and level. Anchor securely to wall and structural supports at each corner if required.

C.3.32.12 Provide materials to construct foundation/base for outdoor cabinets as indicated in Design Drawings.

C.3.32.13 Seal all exterior gaps and penetrations to prevent diminishing NEMA rating and insect/rodent infestations per manufacturing recommendations.

C.3.32.14 Clean electrical parts to remove conductive and harmful materials.

C.3.32.15 Remove dirt and debris from enclosure.

C.3.32.16 Clean finishes and touchup damage.

C.3.33 FURNISH AND INSTALL CAMERA BOX ENCLOSURES (ADDITIVE ALTERNATIVE CLIN 0068)

C.3.33.1 Special Provision Pay Item No. 630 72

C.3.33.2 Provide Remote Camera Box enclosures as indicated in the TR Bridge Design Drawings and herein.

C.3.33.3 TR Bridge shall be rated NEMA 3R enclosure, or as indicated on Design Drawings. The Contractor shall field verify dimensions before fabrication. TR 16, 18 and 36 shall be surface mounted cabinets.

C.3.33.4 Refer to section C.3.32 for camera box requirements.

C.3.34 FURNISH AND INSTALL CAMERA BOX ENCLOSURES (CLIN 0027)

C.3.34.1 Special Provision Pay Item No. 630 76

C.3.34.2 Provide Camera Box enclosures as indicated in the 3rd Street Tunnel Design Drawings and herein.

C.3.34.3 The 3rd Street Tunnel all enclosures, above ground junction boxes and camera boxes shall be shall be rated NEMA 4x enclosure, or as indicated on Design Drawings.

C.3.34.4 Refer to section C.3.32 for camera box requirements.

C.3.35 FURNISH AND INSTALL TYPE 336-SS TRAFFIC CABINETS AND FOUNDATIONS (CLIN 0028 AND ADDITIVE ALTERNATIVE CLIN 0069)

C.3.35.1 Special Provision Pay Item No. 630 78

C.3.35.2 Provide traffic cabinets and foundations in accordance with DDOT Standard specification 617 and Drawings 617.10, 617.11, 617.13 and 617.14 to house CIP Network switches and Ethernet modems, refer to Video Surveillance System section of these Special Provisions. Cabinets shall be located next to existing traffic cabinets so the Contractor can connect to existing traffic signal cable plant. Cabinet locations are 23rd Street NW and Constitution Avenue NW for the Theodore Roosevelt Bridge and 3rd and D Streets NW along with the following anticipated repeater locations:

C.3.35.2.1 It is anticipated 2 repeater sites are required for the TR Bridge:

C.3.35.2.1.1 Cabinet #12 at 17th and Massachusetts Ave NW; and

C.3.35.2.1.2 Cabinet #58 At 17th and D Streets NW.

C.3.35.2.2 It is anticipated 3 repeater sites are required for the 3rd St tunnel:

C.3.35.2.2.1 Cabinet #6 at S and 16th Streets NW;

C.3.35.2.2.2 Cabinet #70 at I and 16th Streets NW; and

C.3.35.2.2.3 Cabinet #47 at E and 11th Streets NW.

C.3.35.3 It is the Contractor's responsibility to coordinate with DDOT Traffic to confirm spare copper pair wires are available at these locations and to ensure that the distance limitations of the Ethernet modems are NOT EXCEEDED.

C.3.35.4 Cabinets shall be complete, ready for installation pre-wired with transformers, terminal blocks, over-current protection devices, surge protection devices and fiber optic connectors. The cabinets shall be keyed to DDOT's keying system. Cabinets shall be assembled by a UL Certified electrical shop.

C.3.35.5 Construct foundation and install cabinets according to manufacturer's recommendations and DDOT specifications. Contractor shall provide all required conduit, cabling, mounting hardware and ancillary components to professionally install and connect as

an integral part of the CIP System. Penetrations shall be as per manufacturer's recommendations and sealed with gaskets so as not to de-rate the NEMA rating.

C.3.35.6 Each Type 336-ss Traffic Cabinet shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein. Conduit and cable to Pepco electrical service and existing DDOT traffic cabinet, foundation and cabinet adapter base are incidental to this item.

C.3.35.7 Refer to section C.3.32 for cabinet requirements.

C.3.36 FURNISH AND INSTALL NETWORK CABINETS (CLIN 0029)

C.3.36.1 Special Provision Pay Item No. 630 80

C.3.36.2 Provide Network cabinets as indicated in the Design Drawings and herein. Network cabinets shall be located at the 3rd Street Tunnel control room and the DDOT TMC equipment room cabinets shall match existing cabinets in the TMC equipment room which are IBM Netfinity units, model 42E. the cabinet shall enclose Network switches, servers, Ethernet modems and UPS for the CIP system.

C.3.36.3 Install cabinets according to manufacturer's recommendations and as indicated on the Design Drawings. Contractor shall install a new 208 VAC, 30amp electric circuit to power the cabinet. Contractor shall provide all required cabling, hardware and ancillary components to professionally install the Network Cabinets as an integral part of the CIP System.

C.3.36.4 Each Network Cabinet shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein. EMT conduit and cable to connect TMC cabinet to existing electrical panel shall be considered incidental to this item. Contractor shall also provide and install cabling from DDOT cable vault (Traffic Controller cable vault) in the TMC building (Reeves Building) to the CIP Network Cabinet which shall be incidental to the project. The cabling shall be consistent with existing DDOT Traffic cables.

C.3.36.5 Refer to section C.3.32 for cabinet requirements.

C.3.37 FURNISH AND INSTALL NEMA 12 NETWORK CABINETS (CLIN 0030)

C.3.37.1 Special Provision Pay Item No. 630 82

C.3.37.2 Provide a NEMA 12 rated Network cabinets as indicated in the Design Drawings and herein. Network cabinet shall be located at the 3rd Street Tunnel (Air Rights Tunnel, auxiliary area) as shown on the plans. The cabinet shall enclose three (3) 48-port fiber optic termination panels as described in the Video Surveillance section of these Special provisions.

The cabinet shall be double hinged with a glass front door. Door shall be key lockable and the cabinet shall have adjustable 19" rack angles.

C.3.37.3 Install cabinets according to manufacturer's recommendations and as indicated on the Design Drawings. Contractor shall provide all required hardware and ancillary components to professionally install the Network Cabinets as an integral part of the CIP System. Penetrations shall be as per manufacturer's recommendations and sealed with gaskets so as not to de-rate the NEMA rating.

C.3.37.4 Each NEMA 12 Network Cabinet shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein. EMT conduit and cable to connect TMC cabinet to existing electrical panel shall be considered incidental to this item.

C.3.37.5 Refer to section C.3.32 for cabinet requirements.

C.3.38 FURNISH AND INSTALL NEMA 4X COMMUNICATIONS CABINET AND FOUNDATION (ADDITIVE ALTERNATIVE CLIN 0070)

C.3.38.1 Special Provision Pay Item No. 630 84

C.3.38.2 Provide Communications Cabinet and foundation at the Theodore Roosevelt Bridge in accordance with DDOT Standard specification 617 and Design Drawings to house CIP network servers, switches, fiber optic video media converters MPEG-4 encoders and Ethernet modems, refer to Video Surveillance System section of these Special Provisions. Communications Cabinet shall consist of one (1) double NEMA 4x cabinet as described in Design Drawings, which shall enclose all necessary equipment for the CIP System on site. It shall be mounted on a Contractor-provided and constructed foundation/base and shall provide the required temperature and environment for equipment mounted inside by using and onboard HVAC system. The Communications Cabinet shall be supplied from a 240 VAC electric service from the bridge abutment. The cabinet shall be supplied with the following:

C.3.38.2.1 All electrical cabling, over-current and surge protection devices required to power internal equipment. Terminal blocks circuit breakers and surge protection shall be DIN rail mounted and mounted to an internal panel supplied by the cabinet manufacturer.

C.3.38.2.2 Cabinet shall be pre-wired and assembled by a UL certified shop.

C.3.38.2.3 Shall be keyed to DDOT's keying system.

C.3.38.2.4 Shall be sized to properly mount all required CIP equipment and cabling as well as maintaining documented cable bending radius.

C.3.38.2.5 All internal wiring shall be 12 AWG minimum conductors or as indicated on Design Drawings.

C.3.38.3 Cabinets shall be complete, ready for installation pre-wired with transformers, terminal blocks, over-current protection devices and surge protection devices. Cabinets shall be assembled by a UL Certified electrical shop.

C.3.38.4 Construct foundation and install cabinet according to manufacturer's recommendations and DDOT specifications. Contractor shall provide all required conduit, cabling, mounting hardware and ancillary components to professionally install and connect as an integral part of the CIP System. Penetrations shall be as per manufacturer's recommendations and sealed with gaskets so as not to de-rate the NEMA rating.

C.3.38.5 Each NEMA 4x Communications Cabinet shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein.

C.3.38.6 Refer to section C.3.32 for cabinet requirements.

C.3.39 FURNISH AND INSTALL NEMA 3R JUNCTION BOXES (ADDITIVE ALTERNATIVE CLIN 0071)

C.3.39.1 Special Provision Pay Item No. 630 86

C.3.39.2 Provide Junction Boxes for the Theodore Roosevelt Bridge rated NEMA 3R as indicated in the Design Drawings and herein. The Junction boxes shall be metallic and shall be sized 12" x 12" minimum for the TR Bridge. The Junction Boxes shall be hinged and secured with tamper resistant screws. Penetrations shall be as per manufacturer's recommendations and sealed with gaskets so as not to de-rate the NEMA rating.

C.3.39.3 Install Junction Boxes according to manufacturer's recommendations and as indicated on the Design Drawings. Contractor shall provide all required hardware and ancillary components to professionally install the Junction Boxes as an integral part of the CIP System.

C.3.39.4 Each Junction Box shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein.

C.3.39.5 Refer to section C.3.32 for cabinet requirements.

C.3.40 FURNISH AND INSTALL NEMA 4x JUNCTION BOXES (CLIN 0031)

C.3.40.1 Special Provision Pay Item No. 630 88

C.3.40.2 Provide a Junction Boxes for the 3rd Street Tunnel rated NEMA 4x as indicated in the Design Drawings and herein. The Junction boxes shall be metallic and shall be sized 16" x 16" minimum for the 3rd Street tunnel. The Junction Boxes shall be hinged and secured with tamper resistant screws. Penetrations shall be as per manufacturer's recommendations and sealed with gaskets so as not to de-rate the NEMA rating.

C.3.40.3 Install Junction Boxes according to manufacturer's recommendations and as indicated on the Design Drawings. Contractor shall provide all required hardware and ancillary components to professionally install the Junction Boxes as an integral part of the CIP System.

C.3.40.4 Each Junction Box shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein.

C.3.40.5 Refer to section C.3.32 for cabinet requirements.

C.3.41 FURNISH AND INSTALL NEMA 4x JUNCTION BOXES (CLIN 0032)

C.3.41.1 Special Provision Pay Item No. 630 90

C.3.41.2 Provide a Junction Boxes for the 3rd Street Tunnel rated NEMA 4x as indicated in the Design Drawings and herein. Junction Boxes at each camera in the 3rd Street Tunnel shall be 8" x8" minimum. The Junction Boxes shall be hinged and secured with tamper resistant screws. Penetrations shall be as per manufacturer's recommendations and sealed with gaskets so as not to de-rate the NEMA rating.

C.3.41.3 Install Junction Boxes according to manufacturer's recommendations and as indicated on the Design Drawings. Contractor shall provide all required hardware and ancillary components to professionally install the Junction Boxes as an integral part of the CIP System.

C.3.41.4 Each Junction Box shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein.

C.3.41.5 Refer to section C.3.32 for cabinet requirements.

C.3.42 FURNISH AND INSTALL PANELBOARDS (ADDITIVE ALTERNATIVE CLIN 0072)

C.3.42.1 Special Provision Pay Item No. 630 92

C.3.42.2 Provide, install and connect electrical branch circuit panelboards where indicated on Design Drawings.

C.3.42.3 Comply with DDOT Standard Specifications – Section 621.02 and include:

C.3.42.3.1 International Electrical Testing Association (IETA)

C.3.42.4 Comply with DDOT Standard Specifications – Sections 105.02 and 105.03 and include:

C.3.42.4.1 Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.

- C.3.42.4.2 Product Data: Submit catalog data showing specified features of standard products.
- C.3.42.5 Comply with DDOT Standard Specifications – Sections 106.02 and 106.08
- C.3.42.6 Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.
- C.3.42.7 Panelboard Bus: Copper, current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard; furnish insulated ground bus as indicated on Design Drawings.
- C.3.42.8 For non-linear load applications subject to harmonics furnish 200 percent rated, plated copper, solid neutral.
- C.3.42.9 Minimum Integrated Short Circuit Rating: 30,000 amperes rms symmetrical for 480 volt panelboards.
- C.3.42.10 Molded Case Circuit Breakers: NEMA AB 1, bolt-on plug-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Design Drawings. Do not use tandem circuit breakers.
- C.3.42.11 Current Limiting Molded Case Circuit Breakers: NEMA AB 1, circuit breakers with integral thermal and instantaneous magnetic trip in each pole, coordinated with automatically resetting current limiting elements in each pole. Interrupting rating 100,000 symmetrical amperes, let-through current and energy level less than permitted for same size NEMA FU 1, Class RK-5 fuse.
- C.3.42.12 For existing Panelboards the Contractor shall provide and install new circuit breakers for all CIP circuits connected to the panel and shall be comparable to existing breakers. The new breakers are considered ancillary and shall not be paid for separately for this project.
- C.3.42.13 Enclosure: NEMA Type 3R.
- C.3.42.14 Cabinet Box: 6.5 inches deep, 20 inches wide for 480 volt panelboard.
- C.3.42.15 Cabinet Front: Surface mount cabinet, concealed hinge, metal directory frame, and flush lock keyed alike. Finish in manufacturer's standard gray enamel.
- C.3.42.16 Comply with DDOT Standard Specifications – Section 621 and include:
C.3.42.16.1 Install panelboards in accordance with NEMA PB 1.1.

- C.3.42.16.2 Install panelboards plumb.
- C.3.42.16.3 Install recessed panelboards flush with wall finishes.
- C.3.42.16.4 Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.
- C.3.42.16.5 Install filler plates for unused spaces in panelboards.
- C.3.42.16.6 Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads.
- C.3.42.16.7 Install engraved plastic nameplates in accordance with Electrical Identification section of these Special Provisions.
- C.3.42.16.8 Ground and bond panelboard enclosure. Connect equipment ground bars of panels in accordance with NFPA 70.

- C.3.42.17 Comply with DDOT Standard Specifications – Sections 621.16 and include:
 - C.3.42.17.1 Inspect and test in accordance with NETA ATS, except Section 4.
 - C.3.42.17.2 Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.
 - C.3.42.17.3 Perform switch inspections and tests listed in NETA ATS, Section 7.5.
 - C.3.42.17.4 Perform controller inspections and tests listed in NETA ATS, Section 7.16.1.
 - C.3.42.17.5 ADJUSTING. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

C.3.42.18 Each Panel Board shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein.

C.3.43 FURNISH AND INSTALL TRANSFORMER (ADDITIVE ALTERNATIVE CLIN 0073)

- C.3.43.1 Special Provision Pay Item No. 630 94
- C.3.43.2 Provide, install and connect control, buck boost and step-up/down transformers as indicated on the Design Drawings.
- C.3.43.3 Contractor is to provide all ancillary components to install transformers according to applicable national and local codes having jurisdiction.
- C.3.43.4 Comply with DDOT Standard Specifications – Division 100 – all sections and section 621.02 and include:
 - C.3.43.4.1 International Electrical Testing Association (IETA)
- C.3.43.5 Submittals. Comply with DDOT Standard Specifications – Sections 105.02 and 105.03 and include:
 - C.3.43.5.1 Product Data: Submit outline and support point dimensions of enclosures and accessories, unit weight, voltage, kVA, k-factor, and impedance ratings and characteristics, tap configurations, insulation system type, and rated temperature rise.

- C.3.43.5.2 Record actual locations of transformers on as-built drawings.
- C.3.43.6 Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.
- C.3.43.7 Delivery, Storage, and Handling. Comply with DDOT Standard Specifications – Section 106.07 and 106.08 and include:
- C.3.43.7.1 Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.
- C.3.43.7.2 Handle in accordance with manufacturer's written instructions. Lift only with lugs provided. Handle carefully to avoid damage to transformer internal components, enclosure, and finish.
- C.3.43.8 Description: factory-assembled, air cooled dry type transformers, ratings as indicated on Design Drawings, transformers designed to supply 100 percent nonlinear load.
- C.3.43.9 Control transformers shall be 208 to 24 VAC for the 3rd St Tunnel; 480 to 24 VAC for the TR Bridge rated as indicated on the Design Drawings.
- C.3.43.10 Step-up/down transformer shall be 240 to 480 VAC rated as indicated on the Design Drawings.
- C.3.43.11 Contractor is responsible for providing and installing 208 VAC boost transformers if proposed cameras load increases voltage drop and it affects camera operation.
- C.3.43.12 Core Flux Density: Below saturation at 10 percent primary overvoltage.
- C.3.43.13 Insulation and temperature rise: Class 220 insulation system with 115 °C average winding temperature rise.
- C.3.43.14 Case temperature: Do not exceed 35 °C rise above ambient at warmest point at full load.
- C.3.43.15 Winding Taps:
- C.3.43.15.1 Transformers Less than 15 kVA: Two 5 percent below rated voltage, full capacity taps on primary winding.
- C.3.43.15.2 Transformers 15 kVA and Larger: NEMA ST 20.
- C.3.43.16 Basic Impulse Level: 10 kV for transformers less than 300 kVA, 30 kV for transformers 300 kVA and larger.
- C.3.43.17 Ground core and coil assembly to enclosure by means of visible flexible copper grounding strap.

- C.3.43.18 Mounting:
 - C.3.43.18.1 1-15 kVA: Suitable for wall mounting.
 - C.3.43.18.2 16-75 kVA: Suitable for, floor , or trapeze mounting.
 - C.3.43.18.3 Larger than 75 kVA: Suitable for floor or trapeze mounting.

- C.3.43.19 Coil Conductors: Continuous copper windings with terminations brazed or welded. Individually insulate secondary conductors and arrange to minimize hysteresis and eddy current losses at harmonic frequencies. Size secondary neutral conductor at twice secondary phase conductor ampacity.

- C.3.43.20 Electrostatic Shield: Copper, between primary and secondary windings.

- C.3.43.21 Enclosure: NEMA Type 3R, ventilated. Furnish lifting eyes or brackets.

- C.3.43.22 Isolate core and coil from enclosure using vibration-absorbing mounts.

- C.3.43.23 Nameplate: Include transformer connection data and overload capacity based on rated allowable temperature rise.

- C.3.43.24 Production test each unit according to NEMA ST 20.

- C.3.43.25 Verify mounting supports are properly sized and located, including concealed bracing in walls, where applicable.

- C.3.43.26 Existing Work. Maintain access and adequate ventilation to existing transformers and other installations remaining active and requiring access and ventilation. Modify installation or provide access panel or ventilation grilles.

- C.3.43.27 Set transformer plumb and level.

- C.3.43.28 Use flexible conduit, 2 feet minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

- C.3.43.29 Support transformers:
 - C.3.43.29.1 Mount wall-mounted transformers using integral flanges or accessory brackets furnished by manufacturer.
 - C.3.43.29.2 Mount floor-mounted transformers on vibration isolating pads suitable for isolating transformer noise from building structure.
 - C.3.43.29.3 Mount trapeze-mounted transformers as indicated on Design Drawings.

- C.3.43.30 Provide seismic restraints.

- C.3.43.31 Install grounding and bonding in accordance with manufacturer's requirements and comply with DDOT Standard Specifications – Sections 621.05 and 621.06.

- C.3.43.32 Comply with DDOT Standard Specifications – Section 621 and include:
 - C.3.43.32.1 Inspect and test in accordance with NETA ATS, except Section 4.
 - C.3.43.32.2 Perform inspections and tests listed in NETA ATS, Section 7.2.1.
- C.3.43.33 Adjusting. Comply with DDOT Standard Specifications – Section 621.16 and include:
 - C.3.43.33.1 Measure primary and secondary voltages and make appropriate tap adjustments.
- C.3.43.34 Each Transformer shall be paid at the contract unit price. Payment shall include all labor, material, equipment and all incidentals to complete the work described herein.

C.3.44 MOBILIZATION (CLIN 0033 AND ADDITIVE ALTERNATIVE CLIN 0074)

- C.3.44.1 Special Provision Pay Item No. 630 96
- C.3.44.2 In accordance with DDOT Standard Specification – Section 612:
 - C.3.44.3 This work is the assembly and set-up of the general plant to comply with the contract and with local and State laws and regulations. General plant includes Contractor's offices, shops, plants, storage areas, and sanitary or other facilities. This work includes obtaining required permits, insurance, bonds and any other items required for the start of work.
 - C.3.44.4 Furnish adequate material and furnishings required.
- C.3.44.5 The unit of measure for Mobilization shall be Lump Sum in accordance with DDOT Standard Specification – Section 612.02.

C.3.45 ELECTRIC SERVICE (CLIN 0034 AND ADDITIVE ALTERNATIVE CLIN 0075)

- C. .45.1 Special Provision Pay Item No. 630 98
- C.3.45.2 This work is furnishing, installation, erection and wiring of the Electrical Service. This work also includes the installation of all electrical cables and conduit to make the connection to the electric service utility (Pepco) facilities. New services are required at the Theodore Roosevelt Bridge abutment and every CIP traffic cabinet installed for both the Bridge and the 3rd Street Tunnel (refer to Cabinet/Traffic Cabinet section of these Special Provisions, for anticipated locations).
- C.3.45.3 In accordance with DDOT Standard Specifications – Sections 621, and in accordance with Pepco design manual.

C.3.45.4 In accordance with DDOT Standard Specifications – Section 618 as applicable, and as follows:

C.3.45.4.1 Install conduit, cable, meter pan and fused disconnect in accordance with DDOT Standard Specifications and Pepco design manual.

C.3.45.4.2 Include all electric utility company service connection charges and comply with any electric utility company requirements in furnishing and installing a complete power supply system.

C.3.45.4.3 Coordinate the electric utility company work as required.

C.3.45.4.4 Before starting Construction, verify existing underground infrastructure

C.3.45.4.5 Each Electric Service shall be paid at the contract unit price. Payment shall include all labor, material, equipment, testing and all incidentals to complete the work described herein.

C.3.46 PEPCO COORDINATION (CLIN 0035 AND ADDITIVE ALTERNATIVE CLIN 0076)

C.3.46.1 Special Provision Pay Item No. 630 100

C.3.46.2 In accordance with DDOT Standard Specification – Section 618.41 and include:

C.3.46.2.1 Contractor is responsible for payment and completion of Pepco services, service applications and other Pepco requirements needed to provide electric service to the CIP devices.

C.3.47 SPARE COMPONENTS (CLIN 0036)

C.3.47.1 Special Provision Pay Item No. 630 102

C.3.47.2 Provide, at a minimum, the spare components indicated in these Special Provisions. DDOT may request additional spare components prior to project completion that are not specified here. These shall be provided at the unit price that was previously agreed upon by both DDOT and the Contractor, or by other agreement that is mutually agreeable.

C.3.47.3 The Contractor shall provide the following spare parts:

C.3.47.3.1 2-Fixed cameras.

C.3.47.3.2 2-PTZ Dome Cameras.

C.3.47.3.3 2-Ethernet modems with power supplies.

C.3.47.3.4 2-Video encoders with power supplies.

C.3.47.3.5 2-Fiber optic video media converters with power supplies.

C.3.47.3.6 2-UPS; 1-208VAC; 1-240VAC.

C.3.47.3.7 2-Network Servers.

C.3.47.3.8 1-Network Gateway.

C.3.47.4 Delivery, Storage, and Handling. Comply with DDOT Standard Specifications – Section 106.07 and 106.08 and include:

C.3.47.4.1 Store in clean, dry space. Maintain factory wrapping or provide additional canvas or plastic cover to protect units from dirt, water, construction debris, and traffic.

C.3.47.4.2 Handle in accordance with manufacturer's written instructions. Handle carefully to avoid damage to internal components, enclosure, and finish.

C.3.47.4.3 Deliver to a storage facility of DDOT's choosing prior to project completion

C.3.47.5 Production test each unit according to the Special Provisions for each component.

C.3.47.6 Product Description: as described herein for each component.

C.3.47.7 The unit of measure for Spare Components shall be Lump Sum. The Lump Sum shall be calculated as the sum of each unit price without installation costs.

C.3.48 FURNISH BENCH TEST EQUIPMENT AND SOFTWARE (CLIN 0037)

C.3.48.1 Special Provision Pay Item No. 630 104

C.3.48.2 A Bench Test Simulator shall be provided and installed by the Contractor as part of the CIP system. The Bench Test Simulator is anticipated to be utilized to support maintenance functions such as troubleshooting and other system diagnostic activities, as well as training for DDOT Maintenance staff and other personnel.

C.3.48.3 The contractor shall furnish the Bench Test Simulator which shall be delivered and assembled with all equipment necessary to operate the CIP system, including, but not limited to, component equipment, parts, and software applications required to simulate a critical infrastructure protection system.

C.3.49 FURNISH AND INSTALL NETWORK GATEWAY (CLIN 0038)

C.3.49.1 Special Provision Pay Item No. 630 07

C.3.49.2 Work under this item shall consist of furnishing and installing a network gateway to provide protection from unauthorized access to the TMC LAN from remote CIP Ethernet interfaces at CIP communication and traffic cabinet locations. The Gateway shall be installed in the TMC equipment room and interface between the Ethernet modems and CIP Network Switch as shown on the Design Drawings. The Gateway shall consist of a firewall, router or firewall software in accordance with DDOT IT equipment standards and security policies.

C.3.49.3 Install Network Gateway and/or software according to manufacturer's recommendations and provision according to DDOT IT security policies. Contractor shall provide all required cabling, software, operating systems, licenses and ancillary hardware/software and components to professionally install and provision the network servers as an integral part of the CIP System.

C.3.49.4 Each Network Gateway shall be paid at the contract unit price. Payment shall include all labor, material, testing equipment and all incidentals to complete the work described herein.

C.3.50 DOCUMENTATION (CLIN 0039 AND ADDITIVE ALTERNATIVE CLIN 0077)

C.3.50.1 Special Provision Pay Item No. 630 02

C.3.50.2 Refer to Section F.2 for detailed Documentation requirements.

C.3.50.3 The unit of measure for Documentation shall be Lump Sum.

C.3.51 MAINTENANCE OF TRAFFIC PLANS (MOT PLANS) (CLIN 0040 AND ADDITIVE ALTERNATIVE CLIN 0078)

C.3.51.1 Special Provision Pay Item No. 630 06

C.3.51.2 Prepare a Traffic Control Plan for the Mall/Air Rights Tunnels (base bid) and Theodore Roosevelt Bridge (additive alternative) in accordance with the requirements contained in the July 2006 edition of the "District of Columbia Temporary Traffic Control Manual".

C.3.51.3 The Contractor will develop Traffic Control Plans and drawings in MicroStation format. Plans and drawings will be submitted to DDOT for approval before any work shall begin.

C.3.51.4 The unit of measure for MOT Plans shall be Lump Sum.

C.3.52 MAINTENANCE OF TRAFFIC (MOT) (CLIN 0041 AND ADDITIVE ALTERNATIVE CLIN 0079)

C.3.52.1 Special Provision Pay Item No. 630 04

C.3.52.2 Coordinate work area lane closures in the Mall Tunnel and Air Rights Tunnel to provide smooth traffic flow (i.e., for traffic moving in the same direction do not simultaneously close the left lane in the Air Rights Tunnel and the right lane in the Mall Tunnel).

C.3.52.2.1 Provide a knowledgeable Traffic Control Supervisor with sufficient manpower and equipment to expeditiously install, clean, straighten, repair, and maintain signs and change traffic control patterns. Have the Traffic Control Supervisor make daily field reviews of all devices and traffic operations and undertake immediate remedial action of all deficiencies noted. Replace defective or inoperative Arrow Panels immediately upon notification. Document in a diary, kept current at all times, all inspections, reviews, and corrective action taken pertaining to the placement of signs, devices and the directing of traffic. If adjacent construction operations require modifications in the maintenance and protection of traffic, submit a revised traffic control plan for approval of the DDOT Engineer.

C.3.52.2.2 Maintain constant surveillance of the traffic control operations and replace or correct any missing, damaged, ineffective, or misaligned equipment to the satisfaction of the Engineer.

C.3.52.2.3 Provide properly attired flaggers, as required, to direct and control traffic around work areas, and to control the entrance and exit of construction vehicles from work areas.

C.3.52.2.4 Install all traffic control devices as indicated on the Traffic Control Plan. Have any deviation from the Traffic Control Plan approved by the Engineer at least two (2) weeks prior to starting construction.

C.3.52.2.5 When separate contracts are awarded within the limits, or adjacent to, remove, or relocate traffic control devices as directed by the Engineer. Install or relocate channelizing devices for smooth flow of traffic, as directed, between work zones. When other contractors finish their work, and modification to traffic control plan is no longer required, remove, relocate or install traffic control devices as intended for this project, as directed.

C.3.52.2.6 Do not park or stop vehicles in open traffic lane or shoulder adjacent to an open traffic lane. Do not park personal vehicles within the construction area, without permission of the Engineer.

C.3.52.3 Procedures. Install and maintain the temporary signs and traffic control devices in accordance with the provisions of the MUTCD. Reflectorize all warning signs, drums and barricades used for traffic control using Type VIII reflective sheeting. Cover or remove all conflicting signs.

C.3.52.3.1 DDOT will inspect all traffic control devices prior to the start of work.

C.3.52.3.2 At all locations within the project limits where existing official traffic signs and devices are removed or relocated, jointly survey and record with the Engineer all official signs and devices by standard number, description, size, and station (left side/right side) before operations begin.

C.3.52.3.3 Remove and store devices so that the reflective sheeting face is not damaged or scratched. Reset vital signs on temporary supports as directed. Upon completion of operations, reinstall all permanent signs and devices, as directed.

C.3.52.3.4 Replace in kind all signs or posts damaged during removal or installation at no expense to DDOT.

C.3.52.3.5 Notify DDOT two (2) weeks prior to any lane or shoulder closures.

C.3.52.3.6 Maintain access to all local driveways at all times.

- C.3.52.3.7 Cover or remove from sight all signs not in use
- C.3.52.3.8 Place all traffic control channeling devices in the direction of the traffic flow.
- C.3.52.3.9 Prohibit personnel from crossing the roadway or walking along the highway, except within designated work areas.
- C.3.52.3.10 Do not interfere with the open traffic lane(s) at any time. This includes, but is not limited to, equipment counterweights swinging into the lane(s), etc.
- C.3.52.3.11 Maintain travel lanes in good condition when in use. Immediately remove any earth, gravel, or other material tracked or spilled on traffic lanes or shoulders not in protected work areas.
- C.3.52.3.12 Immediately upon completion of the work, remove the traffic control devices. Unless otherwise specified the devices remain the Contractor's property.
- C.3.52.3.13 Coordinate delivery of materials to minimize the inconvenience to the traveling public.
- C.3.52.3.14 Restore all areas damaged during construction to their original preconstruction conditions. Replace any plantings, trees or ground coverings disturbed, damaged or removed in-kind. This work is considered incidental to the project and no separate payment will be made for this work
- C.3.52.4 TIME RESTRICTIONS
 - C.3.52.4.1 Peak hours are as follows:
 - C.3.52.4.1.1 6:00 AM to 9:30 AM Monday to Friday
 - C.3.52.4.1.2 3:00 PM to 7:00 PM Monday to Friday
 - C.3.52.4.2 Do not perform travel lane restrictions or perform any activities, which will impede traffic during the following periods:
 - C.3.52.4.2.1 New Year's Day
 - C.3.52.4.2.2 Martin Luther King's Birthday
 - C.3.52.4.2.3 President's Day
 - C.3.52.4.2.4 Memorial Day
 - C.3.52.4.2.5 Labor Day

C.3.52.4.2.6 Independence Day

C.3.52.4.2.7 Columbus Day

C.3.52.4.2.8 Veteran's Day

C.3.52.4.2.9 Thanksgiving Day

C.3.52.4.2.10 Christmas Day

C.3.52.4.2.11 Any day declared a holiday as determined by the District of Columbia.

C.3.52.4.2.12 Any special events (e.g., Presidential Inauguration, political functions) as determined by the DDOT.

C.3.52.5 Other Considerations

C.3.52.5.1 DDOT will perform their normal snow removal operation over the travel ways.

C.3.52.5.2 DDOT reserves the right to limit lane closures.

C.3.52.5.3 When excessive congestion develops, open all lanes to traffic as soon as practically possible (at the discretion of the Engineer).

C.3.52.5.4 The Contractor is responsible for fixing of any displaced, damaged, or destroyed traffic control devices, regardless of who is responsible for such occurrences, at no additional cost to DDOT.

C.3.52.6 The unit of measure for MOT shall be Lump Sum.

DDOT VDS Specifications

SPECIAL PROVISIONS

1. SCOPE OF WORK:

Work under this contract consists of furnishing and installing intrusive Vehicle Detection System (VDS) equipment at 122 locations city-wide including furnishing and installing the communications and monitoring equipment at the Traffic Management Center (TMC). These counting stations shall be used to collect data on count, classification, occupancy and vehicle speed. Data from the VDS shall be conveyed back to the DDOT TMC through the existing traffic signal system network via field and TMC modems provided by the Contractor and data viewing software provided by the detector manufacturer.

The work includes, but is not limited to, the following items:

Furnish and install all necessary sensors, wireless communication devices, field modems, repeaters, all connections, conduit and all necessary wiring, cabling and all mounting hardware associated with the installation of the VDS and successful connection to the existing traffic controller communication network.

Furnish, install, integrate and test all modems, servers, VDS hardware, central software and firmware at the TMC necessary to implement a fully functional Permanent VDS System. Sensor data shall be accessed through manufacturer's software. The Contractor shall utilize the detection equipment from the same manufacturer at all locations, except where otherwise noted. All the furnished equipment shall be new. It shall be neither used nor refurbished.

Furnish and install all equipment necessary to integrate the field devices with the central system hardware at the TMC. Software and data shall be configured to be accessed through the data collection servers in the DDOT network. The Contractor shall follow all DDOT Information Technology (IT) network standards and guidelines for software and hardware installation and integration. The Contractor shall contact the Contracting officer's Technical Representative (COTR) with any questions.

Complete and submit all Global Positioning System (GPS) coordinates as requested on each plan sheet. The GPS data shall utilize Wide Area Augmentation System (WAAS) and meet the requirements in this specification.

Field equipment shall be installed in phases, as directed by the Department.

Prepare all test procedures for approval by DDOT to test each of the VDS locations and the entire VDS System.

Provide training for Department personnel in the installation, maintenance and operation of the permanent VDS equipment and software.

Provide all necessary tree trimming to create an unobstructed line of sight between the Repeaters and Access Points, as directed and approved by the Department. Coordinate with Urban Forestry Administration for tree trimming operations.

Coordinate with Potomac Electric Power Company (PEPCO) for installations of VDS equipment on PEPCO owned poles, as well as for power connections.

Coordinate with National Park Services (NPS) for installation of equipment at locations within NPS property.

Provide all final design, system, maintenance and instructional documentations to DDOT.

Provide all standard Interface Control Documents (ICD) that are eXtensible Markup Language (XML) based to DDOT prior to on-site Standalone Test (SAT).

Work also includes all incidentals needed to complete the project as shown on the Contract Plans, as described in the Specifications and these Special Provisions, or as directed by the Engineer.

The VDS shall be installed as shown on the plans. The VDS detectors shall consist of in pavement wireless sensors. These sites shall operate continuously and collect count, speed, occupancy and vehicle classification data as necessary. The data shall be transmitted from the VDS to the Department's TMC via the traffic signal communications network interface with the Department's existing Local Area Network (LAN). The Access Point data storage memory shall provide for one week of data or a minimum of 1 MB per VDS.

All work shall be performed in accordance with these special provisions, individual work assignment and appropriate provisions of the 2009 Edition of the D.C. Standard Specifications for Highways and Structures, 2009 and material specifications and drawings in the appendix of the document. In addition, all work shall be performed in conformance with applicable provisions of the latest editions of the D.C. and the National Electrical Code (NEC), American Association of State Highway and Transportation officials (AASHTO) and Manual on Uniform Traffic Control Devices (MUTCD).

All work shall be performed in a neat, professional, workmanlike manner and subject to approval by the Engineer. The cables in the controller cabinet, manholes, hand boxes and pole transformer bases shall be neatly arranged, tied and securely racked.

The work to be performed, which shall be as indicated specifically by the plans and specifications or as directed by the Engineer, includes but is not limited to:

The project covers all areas within the District of Columbia.

The contract shall be administered by the Intelligent Transportation System (ITS) Division, Department of Transportation.

The Contractor shall respond to all work under this contract as specified in the Contract Documents and as directed by the Engineer. The Contractor shall have sufficient work forces and bid item materials in stock to perform an assignment. All such materials shall be approved by the DDOT.

The Contractor is responsible for Temporary Traffic Control at all times. The standards are those in or referenced in this contract at the time of the bid opening. Nighttime work may be required at the direction of the Engineer, however no additional compensation shall be allowed and the cost for this work shall be incidental to other pertinent bid items.

2. COORDINATION WITH OTHERS:

In preparation of his/her bid, the bidder is advised to take into consideration of the fact that other contracts have been, shall be or may be let for work in the vicinity of the project area. The Contractor shall coordinate his work and cooperate fully with all others in order to eliminate or curtail delays and interference of any kind. Particular attention shall be made with regard to proper maintenance of highway traffic through the project area. The Contractor shall perform his lane closing and reopening so as not to cause interference with others or to be in conflict with performance of traffic maintenance by others.

The District assumes no liability for contract delays or cost resulting from performance or non-performance of others. The District shall not consider any claims for compensation due to delay, other than written authorized time extension.

7. UNDERGROUND VAULTS

This Special Provision supplements Article 16 of the General Provisions.

The Contractor shall take necessary measures to prevent damage to existing underground vaults within or adjacent to the project. It shall be the Contractor's responsibility to determine exact locations for all underground vaults in the field.

In case of damage to underground vaults by the Contractor, the Contractor shall restore such underground vaults to a condition equivalent to that which existed prior to the damaged by repairing, rebuilding, waterproofing as approved by the vault Engineer, at the Contractor's sole expense. The Contractor shall also be responsible for payment for any business damage or system(s) down time due to the damage of underground vaults. Payment amounts shall be

determined by the vault Engineer and must be paid by the Contractor prior to the final acceptance of the Operational Acceptance Test (OAT).

8. UTILITY PROTECTIVE ALERT:

<u>NAME</u>	<u>TELEPHONE NO.</u>	<u>FACILITIES</u>
"Miss Utility" for Wash, Gas Light Co., Verizon, PEPCO, AT&T	800-257-7777	Gas lines; telephone, electric and communication conduits and cables.
DC Water and Sewer Authority	6983600	Water mains and Sewers
DDOT	442-4549 671-2710 (day) 727-6161 (night) 698-3677	Fire Alarm electrical systems Street lighting inspection Traffic signal systems

In addition to the below the requirements of Section 107.16 of the DDOT Standard Specifications for Highways and Structures, 2009 apply.

The Contractor shall notify the utility companies of all locations prior to the start of pavement sensor installation. The Contractor shall also be responsible for payment for any business damage or system(s) down time due to the damage of underground vaults. Payment amounts shall be determined by the vault Engineer and must be paid by the Contractor prior to the final acceptance of the OAT.

9. MAINTENANCE OF TRAFFIC:

This Special Provision modifies Sections 104.02 and 616 of the DDOT Standard Specifications for Highways and Structures, 2009.

Traffic Flow Restrictions

The actual duration of construction at each work site shall be minimized to reduce exposure to potential hazards. The Contractor shall not conduct any work during the peak traffic hours of 6:30 A.M. to 9:30 A.M. and 3:30 P.M. to 7:00 P.M., Monday thru Friday, except holidays. (Approval from DDOT may be an exception to this restriction where extended work is needed.) The Contractor may occupy one 10-foot lane during the off peak hours and on weekends from 8:00 P.M. Friday to 5:00 A.M. Monday morning. The Contractor shall maintain a minimum of one 11-foot lane for each direction of traffic. Weekend work requires DDOT approval. The

Contractor shall not be permitted to work on more than three (3) sites at one time. Approval to allow work on more than three (3) sites shall be up to the discretion of the Engineer.

The Contractor shall coordinate with the DDOT Engineer or his/her representative to install "No Parking Signs" at areas within two (2) calendar days prior to construction at the specific area. This notification may provide the Contractor with parking for their vehicle(s) in the area of the installations. It is the sole responsibility of the Contractor to provide the locations for "No Parking" to DDOT.

When working on entrance or exit ramps of the Freeway system, the Contractor shall maintain a minimum of one 11-foot lane for ramp traffic, wherever possible, and shall not work on the traveled portion of the ramp. The Contractor shall not close any entrance or exit ramp to/from a freeway without written approval from the DDOT COTR.

Traffic Controls

The Contractor shall submit to the Engineer for approval, Traffic Control Plan (TCP) or may submit typical traffic control based on either the *DDOT Work Zone Safety Guidelines and Standards for Temporary Traffic Control* and/or the MUTCD that are applicable to perform the work prior to starting any construction. The plan shall include but not be limited to, the arrangement, size and location of such items as appropriate warning signs, traffic cones, and arrow panels. These traffic control devices shall conform to the most recent version of the MUTCD and D.C. Design Standards (various typicals are included as a guide) The Contractor shall be responsible for furnishing, installing, maintaining and removing all required traffic control devices during working and non-working hours. All devices shall be in new or like new condition.

The Contractor shall develop and provide to DDOT for approval special TCP's for the following sites, as these sites require short-term temporary ramp closures:

1. 3rd Street N.W. on-ramp to I-395 SB N.W
2. South Capitol Street between I Street and G Street.
3. K Street between Whitehurst Freeway and 27th Street N.W

Lane Closures

When closing a lane, the Contractor shall furnish, install and maintain the necessary signs, channelizing drums, cones, and arrow panels, to affect the lane closure as outlined in paragraph 104.2 Maintenance of Traffic of the Standard Specifications for Highways and Structures, 2009 and these Special Provisions. All flashing arrow panels for lane closures shall be Type "C" trailer mount or Type "B" truck mounted units and be of a noiseless type power source. All road closures require a detour-directing motorist back on to the road they were detoured from. Double lane closures and or road closures require prior approval from the Transportation Operations Administration (TOA).

Note: Channelizing drums shall be required for nighttime operations.

Flaggers

The Contractor shall furnish all necessary flaggers that may be required during the course of construction activities. It is the responsibility of the Contractor, utilities and agencies to ensure that flagging is administered by trained personnel. They shall be equipped with safety vests, 24" stop/slow paddles and helmets as per section 6F-2 of the MUTCD.

Traffic Control Devices

Approved warning signs, channelizing drums, 36" cones, arrow panels, etc. shall be provided to insure motorists of positive guidance in advance of and through the work zone. Erection of regulatory signs such as stop, speed limit and no parking signs must be specifically authorized. Advance Warning signs shall be 48"x 48" in size and the face sheeting shall be Fluorescent Orange High Performance Wide Angle Retro reflective material or equal. Roll-up signs are approved however, they also must be 48"x 48" in size and of the same Orange Fluorescent material.

Note: Mesh roll-up signs are not approved. Sign Supports shall be of a spring-loaded type or equivalent. Tripod or A-frame sign stands are not approved. (All temporary traffic control devices must satisfy National Cooperative Highway Research Program (NCHRP-350) requirements.)

The temporary signs and markings placed in or adjacent to the work zone shall be consistent and visible at all times. The existing signs and markings may be covered and/or removed temporarily if the intended functions of these signs and markings shall not be applicable during construction. However, they shall be replaced promptly when work is completed. All temporary signs no longer applicable to the work zone shall be removed or turned away from traffic. The Contractor shall document all existing pavement markings and signage that is removed due to their work. The Contractor shall place temporary pavement markings at the end of each workday. The Transportation Operations Administration shall approve all temporary and permanent markings.

Night Work

During nighttime hours, the work site shall be made safe for traffic and warning shall be provided by installing electronically illuminated traffic control devices such as Flashing Arrow Panels and warning lights. These devices shall be used in conjunction with other traffic control devices, and their flashing sequence and light intensity shall meet the requirements cited in the MUTCD. All traffic control devices shall be reflectorized during nighttime hours.

Traffic Safety Officer

The Contractor shall provide a competent, full time, Traffic Safety Officer in accordance with the requirements of Section 616.02(B)(1) of the DDOT Standard Specifications for Highways and Structures, 2009.

Pedestrian Safety

The Contractor shall provide Pedestrians with a minimum 4-foot walkway. This walkway should be safe, convenient and replicate as nearly as possible the most desirable characteristics of sidewalks or footpaths. Pedestrians should not be led into direct conflict with the work site operations or mainline traffic moving through or around the work site. All pedestrians including

blind, hearing impaired and physically challenged need protection. All necessary signs and supports for closing sidewalks and detouring pedestrians shall be the Contractor responsibility. Temporary ramps and or protective walkways are also the responsibility of the Contractor.

12. WORK AND STORAGE SPACE:

This Special Provision supplements Article 17B, of GENERAL PROVISIONS, STANDARD CONTRACT PROVISIONS, 1973 and subsequent revisions.

No work and storage area is being designated. The Contractor shall be fully responsible for seeking necessary space and undergoing all required negotiations with the owner of the property to secure its use and for restoring the area to its original condition.

No measure or payment shall be made. The cost for work and storage space is incidental to the project, and costs shall be distributed over all bid items.

34. FURNISH AND INSTALL SENSOR REPEATER ON METAL POLE:

General

This work shall consist of furnishing and installing a wireless, battery-powered sensor repeater onto a metal overhead lighting pole, traffic signal pole, or mast arm, as specified and as approved by the Engineer. This work shall include all necessary hardware (including manufactures pole extension hardware) and electrical connections to install the units on an existing metal overhead lighting pole, traffic signal pole, or mast arm and to convey the data from a magnetic sensor detector to a traffic counter control cabinet, via an Access Point (paid for separately). This work also includes the trimming of any tree limbs or branches to provide a clear line of sight between the sensor repeater and the access point or another sensor repeater or sensors.

Specifications

Repeaters (RP)

A repeater shall support at least 10 sensors.

A repeater shall be battery-powered (10 year battery life) by a field replaceable battery and shall operate at temperatures from -37 °F /-38.3 °C to +176 °F / +80 °C.

All RP components shall be contained within a single housing that conform to NEMA Type 4X and IEC IP67 standards.

The Contractor shall provide all materials required to successfully install the repeater units onto an existing metal traffic signal pole, lighting pole and mast arm, as per the manufacturer's recommendations. The Contractor shall also provide a weatherproof permanent name plate identification tag on every Repeater with their corresponding eight (8) digit number, as

illustrated on the plan sheets. The identification tag shall be approved by DDOT prior to installation by the Contractor.

All sensor repeater components shall have a minimum of a 2-year warranty that includes product defects in materials and workmanship under normal use from the date of acceptance. If a hardware defect arises the manufacturer shall exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product. A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by the manufacturer, assumes the remaining warranty of the original product or ninety (90) calendar days from the date of replacement or repair, whichever provides longer coverage.

During the warranty period, technical support shall be available from the supplier via telephone within 24 hours of the time a call is made by a user, where this support shall be provided by factory-authorized personnel or factory-authorized installers

Installation Coordination

The Contractor shall coordinate the installation of all Repeaters onto a metal overhead lighting pole, traffic signal pole, or mast arm with the appropriate authority (PEPCO or DDOT) before any work begins. Failure to properly coordinate with PEPCO or DDOT, which lead to project delays, is the sole responsibility of the Contractor. The Department is not responsible for utility coordination between the Contractor and the utility company.

Measure and Payment

Each sensor repeater shall be paid for at the contract unit price of each. The price shall include the cost of the repeater and all required labor equipment and materials to install the repeater in the field (on an existing metal overhead lighting pole, traffic signal pole, or mast arm) and render the traffic VDS operational. This work includes all mounting hardware, wiring, repeater calibration, testing, and furnishing documentation to complete the work.

35. FURNISH AND INSTALL SENSOR ACCESS POINT ON A METAL POLE:

General

This work shall consist of the Contractor furnishing and installing a sensor access point onto a metal overhead lighting pole, traffic signal pole, or mast arm, as specified and as approved by the Engineer. This work shall include all necessary hardware (including manufactures pole extension hardware) and electrical connections to install the units on an existing metal overhead lighting pole, traffic signal pole, or mast arm, pole and to run Category-5e (CAT-5e) cable (paid for separately) to convey the data from the access point to a traffic counter control cabinet. This work also includes the trimming of any tree limbs or branches to provide a clear line of sight between the sensor repeater and the access point or another sensor repeater or sensors.

Specifications

Access Point (AP)

An AP shall support the relay of sensor detection data through several interfaces as required by the application

As an option, detection data shall be communicated over TCP/IP via an integrated 10/100BaseT Ethernet interface.

The AP shall be capable of simultaneously communicating detection data via the contact closure interface, optional Ethernet interface, and optional cellular data modem interface.

Each sensor, AP shall be capable of accepting software and firmware upgrades.

The Wireless Battery-Powered Magnetometer VDS shall provide software operating on conventional notebook/portable PCs to support configuration of a sensor, configuration of an AP, configuration of an RP, and to store and retrieve detection data.

An AP shall support at least 48 sensors and shall be factory-configurable to support at least two (2) different power options: Isolated nominal 48 VDC (36-58 VDC) input, consuming a maximum of 3W and providing 1500 V isolation and 5 kV surge protection; via a non-isolated nominal 12 VDC (10-15 VDC) input, consuming a maximum of 2W. The Contractor has the option of using a Power over Ethernet (PoE) injector. The specific PoE shall be submitted to DDOT for approval before being utilized.

An AP shall operate at temperatures from -37 °F / -38.3 °C to +176 °F / +80 °C and shall be contained within a single housing that conforms to NEMA Type 4X and IEC IP67 standards.

The Contractor shall provide all materials required to successfully install the Access Point units onto an existing metal traffic signal pole, lighting pole and mast arm, as per the manufacturer's recommendations. The Contractor shall provide a weatherproof permanent name plate identification tag on every Access Point and Repeater Provide with their corresponding eight (8) digit number, as illustrated on the plan sheets. The identification tag shall be approved by DDOT prior to installation by the Contractor.

All sensor AP components shall have a minimum of a 2-year warranty that includes product defects in materials and workmanship under normal use from the date of acceptance. If a hardware defect arises the manufacturer shall exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product. A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by the manufacturer, assumes the remaining warranty of the original product or ninety (90) calendar days from the date of replacement or repair, whichever provides longer coverage.

During the warranty period, technical support shall be available from the supplier via telephone within 24 hours of the time a call is made by a user, where this support shall be provided by factory-authorized personnel or factory-authorized installers.

Installation Coordination

The Contractor shall coordinate the installation of all Access Points onto a metal overhead lighting pole, traffic signal pole, or mast arm with the appropriate authority (PEPCO or DDOT) before any work begins. Failure to properly coordinate with PEPCO or DDOT, which lead to project delays, is the sole responsibility of the Contractor. The Department is not responsible for utility coordination between the Contractor and the utility company.

Measure and Payment

Each Access Point shall be paid for at the contract unit price of each. The price shall include the cost of the access point and all required labor equipment and materials to install the access point in the field (on an existing metal overhead lighting pole, traffic signal pole, or mast arm) and render the traffic VDS operational. This work includes all mounting hardware, wiring, electrical and data connection to the communication modem within the controller cabinet, calibration, testing, and furnishing documentation to complete the work.

36. FURNISH AND INSTALL SENSOR REPEATER ON WOOD POLE:

General

This work shall consist of furnishing and installing a wireless, battery-powered sensor repeater onto a wooden pole, as specified and as approved by the Engineer. This work shall include all necessary hardware (including manufactures pole extension hardware) and electrical connections to install the units on an existing wooden pole to convey the data from a magnetic sensor detector to a traffic counter control cabinet via an access point. This work also includes the trimming of any tree limbs or branches to provide a clear line of sight between the sensor repeater and the access point or another sensor repeater or sensors.

Specifications

Repeaters (RP)

A repeater shall support at least 10 sensors.

A repeater shall be battery-powered by a field replaceable battery and shall operate at temperatures from -37 °F /-38.3 °C to +176 °F / +80 °C.

All RP components shall be contained within a single housing that conform to NEMA Type 4X and IEC IP67 standards.

The Contractor shall provide all materials required to successfully install the repeater units onto an existing wooden pole, as per the manufacturer's recommendations. The Contractor shall also provide a weatherproof permanent name plate identification tag on every Access Point

and Repeater Provide with their corresponding eight (8) digit number, as illustrated on the plan sheets. The identification tag shall be approved by DDOT prior to installation by the Contractor.

All sensor repeater components shall have a minimum of a 2-year warranty that includes product defects in materials and workmanship under normal use from the date of acceptance. If a hardware defect arises the manufacturer shall exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product. A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by the manufacturer, assumes the remaining warranty of the original product or ninety (90) calendar days from the date of replacement or repair, whichever provides longer coverage.

During the warranty period, technical support shall be available from the supplier via telephone within 24 hours of the time a call is made by a user, where this support shall be provided by factory-authorized personnel or factory-authorized installers.

Installation Coordination

The Contractor shall coordinate the installation of all Repeaters on wooden poles with PEPCO before any work begins. Failure to properly coordinate with PEPCO, which lead to project delays, is the sole responsibility of the Contractor. The Department is not responsible for utility coordination between the Contractor and the utility company.

Measure and Payment

Each sensor repeater shall be paid for at the contract unit price of each. The price shall include the cost of the repeater and all required labor equipment and materials to install the repeater in the field (on an existing wooden pole) and render the traffic VDS operational. This work includes all mounting hardware, wiring, repeater calibration, all pavement replacement, testing, and furnishing documentation to complete the work.

37. FURNISH AND INSTALL ACCESS POINT TO WOOD POLE:

GENERAL

This work shall consist of installing an Access Point onto a wooden pole, as specified and as approved by the manufacturer and Engineer. This work shall include all necessary hardware (including manufactures pole extension hardware) and electrical connections to install the units on an existing wooden pole to run Category-5e (CAT-5e) cable (paid for separately) to convey the data from the Access Point to a traffic counter control cabinet. This work also includes the trimming of any tree limbs or branches to provide a clear line of sight between the sensor repeater and the Access Point or another sensor repeater or sensors.

Specifications

Access Point (AP)

An AP shall support the relay of sensor detection data through several interfaces as required by the application

As an option, detection data shall be communicated over TCP/IP via an integrated 10/100BaseT Ethernet interface.

The AP shall be capable of simultaneously communicating detection data via the contact closure interface, optional Ethernet interface, and optional cellular data modem interface.

Each sensor, AP shall be capable of accepting software and firmware upgrades.

The Wireless Battery-Powered Magnetometer VDS shall provide software operating on conventional notebook/portable PCs to support configuration of a sensor, configuration of an AP, configuration of an RP, and to store and retrieve detection data.

An AP shall support at least 48 sensors and shall be factory-configurable to support at least two (2) different power options: Isolated nominal 48 VDC (36-58 VDC) input, consuming a maximum of 3W and providing 1500 V isolation and 5 kV surge protection; via a non-isolated nominal 12 VDC (10-15 VDC) input, consuming a maximum of 2W. The Contractor has the option of using a Power over Ethernet (PoE) injector. The specific PoE shall be submitted to DDOT for approval before being utilized.

An AP shall operate at temperatures from -37 °F / -38.3 °C to +176 °F / +80 °C and shall be contained within a single housing that conforms to NEMA Type 4X and IEC IP67 standards.

The Contractor shall provide all materials required to successfully install the AP units onto an existing wood traffic signal pole, wood lighting pole, as per the manufacturer's recommendations. The Contractor shall also be responsible for installing all conduits and risers to connect the Access Point to the designated traffic signal controller. All exposed conduit shall be 2-inch Galvanized Rigid Steel (GRS). All underground conduits shall be 2-inch PVC, Schedule 40. The Contractor shall provide a weatherproof permanent name plate identification tag on every Access Point and Repeater Provide with their corresponding eight (8) digit number, as illustrated on the plan sheets. The identification tag shall be approved by DDOT prior to installation by the Contractor.

All sensor AP components shall have a minimum of a 2-year warranty that includes product defects in materials and workmanship under normal use from the date of acceptance. If a hardware defect arises the manufacturer shall exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product. A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by the manufacturer, assumes the remaining warranty of the original product or ninety (90) calendar days from the date of replacement or repair, whichever provides longer coverage.

During the warranty period, technical support shall be available from the supplier via telephone within 24 hours of the time a call is made by a user, where this support shall be provided by factory-authorized personnel or factory-authorized installers.

Installation Coordination

The Contractor shall coordinate the installation of all Access Points and a 2-inch GRS conduit and junction boxes on wooden poles with PEPCO before any work begins. Failure to properly coordinate with PEPCO, which lead to project delays, is the sole responsibility of the Contractor. The Department is not responsible for utility coordination.

Measure and Payment

Each access point shall be paid for at the contract unit price of each. The price shall include the cost of the access point and all required labor equipment and materials to install the access point in the field (on an existing metal overhead lighting pole, traffic signal pole, or mast arm) and render the traffic VDS operational. This work includes all mounting hardware, 2-inch GRS conduit, junction boxes, wiring, electrical and data connection to the communication modem within the controller cabinet, PoE injector (if used), calibration, testing, and furnishing documentation to complete the work.

38. FURNISH AND INSTALL REPEATER TO BRIDGE STRUCTURE :

General

This work shall consist of furnishing and installing a wireless, battery-powered sensor repeater onto bridge structure, as specified and as approved by the Engineer. This work shall include all necessary hardware and electrical connections to install the units on an existing bridge structure and to convey the data from a magnetic sensor detector to a traffic counter control cabinet, via an Access Point (paid for separately). This work also includes the trimming of any tree limbs or branches to provide a clear line of sight between the sensor repeater and the Access Point or another sensor repeater.

Specifications

Repeaters (RP)

A repeater shall support at least 10 sensors.

A repeater shall be battery-powered by a field replaceable battery and shall operate at temperatures from -37 °F /-38.3 °C to +176 °F / +80 °C.

All RP components shall be contained within a single housing that conform to NEMA Type 4X and IEC IP67 standards.

The Contractor shall provide all materials required to successfully install the repeater units onto an existing bridge structure, as per the manufacturer's recommendations. The Contractor shall also provide a weatherproof permanent name plate identification tag on every Access Point

and Repeater Provide with their corresponding eight (8) digit number, as illustrated on the plan sheets. The identification tag shall be approved by DDOT prior to installation by the Contractor.

All sensor repeater components shall have a minimum of a 2-year warranty that includes product defects in materials and workmanship under normal use from the date of acceptance. If a hardware defect arises the manufacturer shall exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product. A replacement product or part, including a user-installable part that has been installed in accordance with instructions provided by the manufacturer, assumes the remaining warranty of the original product or ninety (90) calendar days from the date of replacement or repair, whichever provides longer coverage.

During the warranty period, technical support shall be available from the supplier via telephone within 24 hours of the time a call is made by a user, where this support shall be provided by factory-authorized personnel or factory-authorized installers.

Installation Coordination

The Contractor shall coordinate the installation of all Repeaters on onto an existing bridge structure with DDOT before any work begins. Failure to properly coordinate with DDOT, which lead to project delays, is the sole responsibility of the Contractor. The Department is not responsible for utility coordination between the Contractor and the utility company.

Measure and Payment

Each sensor repeater shall be paid for at the contract unit price of each. The price shall include the cost of the repeater and all required labor equipment and materials to install the repeater in the field (on an existing bridge structure) and render the traffic VDS operational. This work includes all mounting hardware, wiring, repeater calibration, testing, and furnishing documentation to complete the work.

39. TREE TRIMMING:

General

This work shall consist of the Contractor trimming all trees within DDOT Right-of-Way to provide an unobstructed line of sight view between the detectors, Repeaters and Access Points. All tree trimming must be identified by the Contractor and coordinated with the Department as well as the Urban Forestry Administration. The Contractor is responsible for all cleanup and removal of all trimmed materials.

Installation

The Contractor shall utilize either mechanical or motorized equipment to remove tree branches and limbs, as presented to the Department.

Measure and Payment

Due to the minimal amount of tree trimming anticipated on this project, tree trimming is considered incidental to the project costs. There shall be no separate payment for tree trimming provided to the Contractor.

40. FURNISH AND INSTALL COMMUNICATION DSL MODEM:

General

This work shall consist of furnishing and installing a DSL communication modem capable of delivering high-speed Carrier Ethernet services over the Departments existing twisted pair (19 AWG) traffic signal communications network. The DSL modem should be capable of transmitting 5MB up to 3.5 miles. The modem must be comparable with the Departments current DSL modems. The DSL modem shall be located within the traffic signal controller cabinet as well as in the TMC, as specified and as approved by the Engineer. This work shall include all necessary hardware and electrical and communications connections to install the units in an existing traffic signal control cabinet. The Contractor shall coordinate with the DDOT Engineer to determine the specific twisted pair wires to be utilized in each traffic signal control cabinet that shall connect to the DSL modem. Any re-work by the Contractor to connect the DDOT preferred twisted pair wires, without the coordination with DDOT, shall not be paid to the Contractor.

Specifications

Environmental Requirements

Operating Temp. -40° to +65°C

Storage Temp. -40° to +70°C

Relative humidity Up to 95%, non-cond.

Ethernet Interfaces

10/100Base-T 4 ports

Connector: RJ45, Automatic Medium-Dependent Interface Crossover (Auto-MDIX)

100Base-FX/1000Base-FX 1 port (option)

Connector: SFP based, Mobile Subscriber Access (MSA) compliant

High Speed Link (Bonded Copper Pairs)

Requirements

Protocol IEEE 802.3ah 2Base-TL

Line code ITU-T G.991.2 rev. 2

Bandwidth 1-45 Mbps (symmetrical)

Number of Copper Pairs 1- 8

Full duplex

Connector: RJ45 (per modem/pair)

End-to-end Delay 2-4 ms (typical)

Sealing Current 48VDC/4mA nominal

Standards

Spectral Compliance ITU-T G.991.2 (Annex A, B, F)

ETSI TS 101 524 (Annex E)

ANSI T1.417, T1.426

NICC ND1602 (ANFP)

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LAN

Protocols

Dynamic Bridging IEEE 802.1, 8K MAC addresses

VLAN Tagging IEEE 802.1Q

Double Tagging Q-in-Q

MSTP, RSTP, STP IEEE 802.1d

OAM/CFM IEEE 802.3ah, 802.1ag

Management Protocols

SNMP v1 and v2c

Command Line Interface TL1

Remote Access Telnet

Secure Access (option) SSH v2

Time Synchronization SNTP v3

Web Access HTTP

File transfer FTP, TFTP

IEEE 802.3ah EFM OAM Dying Gasp

Installation

Securely mount unit to the inside of the traffic control cabinet. Provide power to each unit utilizing existing power within the traffic control cabinet.

Measure and Payment

Each DSL modem shall be paid for at the contract unit price of each. The price shall include the cost of the modem.

41. FURNISH AND INSTALL COMMUNICATION DSL MODEM REPEATER:

General

This work shall consist of furnishing and installing a DSL communication modem repeater capable of extending the delivering high-speed Carrier Ethernet services over the Departments existing twisted pair traffic signal communications network. The modem repeater must be comparable with the Departments current DSL modem repeaters (Actelis XR239) and power feeding unit (Actelis PFU-8). The DSL modem repeater shall be located within the traffic signal controller cabinet, as specified and as approved by the Engineer. The Contractor shall coordinate with DDOT to identify the traffic cabinet in which the modem repeaters shall be installed. This work shall include all necessary hardware and electrical and communications connections to install the units on an existing traffic signal control cabinet. The Contractor shall also be required to provide a power feeding unit for the repeater. The Contractor shall coordinate with the DDOT Engineer to determine the specific twisted pair wires to be utilized in each traffic signal control cabinet that shall connect to the DSL modem. Any re-work by the Contractor to connect the DDOT preferred twisted pair wires, without the coordination with DDOT, shall not be paid to the Contractor.

SPECIFICATIONS

DSL Repeater

Environmental Requirements

Operating Temp. -40° to +65°C

Storage Temp. -40° to +70°C

Relative humidity Up to 95%, non-cond.

Ethernet Interfaces

10/100Base-T 4 ports

Connector: RJ45, Auto-MDIX

100Base-FX/1000Base-FX 1 port (option)

Connector: SFP based, MSA compliant

High Speed Link (Bonded Copper Pairs)

Protocol IEEE 802.3ah 2Base-TL

Line code ITU-T G.991.2 rev. 2

Bandwidth 1-45 Mbps (symmetrical)

Full duplex

Number of Copper Pairs 1- 8

Connector: RJ45 (per modem/pair)

End-to-end Delay 2-4 ms (typical)

Sealing Current 48VDC/4mA nominal

Standards

Spectral Compliance ITU-T G.991.2 (Annex A, B, F)

ETSI TS 101 524 (Annex E)

ANSI T1.417, T1.426

NICC ND1602 (ANFP)

BIPT BRUO 2005

LAN Protocols

Dynamic Bridging IEEE 802.1,

8K MAC addresses

VLAN Tagging IEEE 802.1Q

Double Tagging Q-in-Q

MSTP, RSTP, STP IEEE 802.1d

OAM/CFM IEEE 802.3ah, 802.1ag

Management Protocols

SNMP v1 and v2c

Command Line Interface TL1

Remote Access Telnet

Secure Access (option) SSH v2

Time Synchronization SNTP v3

Web Access HTTP

File transfer FTP, TFTP

IEEE 802.3ah EFM OAM Dying Gasp

DSL Repeater Power Feeding Unit

Links

8 Pair Copper links and link to ML CO and CPE equipment

Capacity

Supports up to 4 repeater segments across 8 pairs, up to a total of 16 repeaters

Connectors

Terminal block for Copper links and DB-25 for link to ML devices

Management

Dip-switch configuration

Fault reporting - via AUX port, daisy-chaining PFUs or via Alarm contacts

LED Indicators – front panel

Power Requirements

Power +/-120 VDC, -190 VDC

Consumption < 125W (-48V Nominal)

Output Non-simplex powering

±130 VDC , -190 VDC

Installation

Coordinate with DDOT to determine which traffic control cabinet to install the repeater and power feeding units. Securely mount both units to the inside of the traffic control cabinet. Provide power to each unit utilizing existing power within the traffic control cabinet.

Measure and Payment

Each combination of DSL modem repeater and power feeding unit shall be paid for at the contract unit price of each. The price shall include the cost of the repeater modem, power feeding unit and all required labor equipment and materials to install the modem in the field (in an existing traffic signal control cabinet), (retrofitting the traffic control cabinet is paid for separately) and render the traffic VDS operational. This work includes all mounting hardware, all electrical and communications wiring, setup, testing, and furnishing documentation to complete the work.

42. FURNISH AND INSTALL COMMUNICATION CABLE (CAT-5E) :

General

This work shall consist of furnishing and installing communication Category 5 (CAT-5 Extended) cable for outdoor use to connect the sensor access point to the DSL communications modem within the traffic signal control cabinet, as specified and as approved by the Engineer. This work shall include all necessary hardware, terminators, connectors, clearing/dewatering all conduits to install CAT-5e cable in the conduit to successfully connect the DSL communication modems

(paid for separately) in a traffic counter control cabinet to the access point unit (paid for separately).

Specifications

The CAT-5e cable shall conform to EIA/TIA-568 and have the following features:

Jacket Material - High density polyethylene (HDPE) or Polyvinyl chloride (PVC)

Operating Temperature - Minimum -94 °F; Maximum 167 °F

The Contractor shall provide all materials required to successfully retrofit the existing traffic signal controller cabinet to house the DSL communication modem.

It is the Contractors responsibility to provide the Communication cable connection within the conduits depicted on the plan set. Under the supervision of DDOT, the cable connection shall also include the clearing of any conduit, repairing any damaged conduits, and removal of water as required.

Measure and Payment

Communication Cable (CAT – 5e) shall be paid for at the contract unit price of Linear Feet. The price shall include the cost of all required labor, equipment (including terminators) to make the VDS detection system to render the traffic VDS detection system operational. This work includes all mounting hardware, cable terminations, repairing any damaged conduit, clearing/dewatering all conduits to install CAT-5e cable and furnishing documentation to complete the work.

43. RETROFIT TRAFFIC CONTROL CABINET:

General

This work shall consist of retrofitting the existing traffic signal control cabinet to house the proposed DSL communications modems (paid for separately), as specified and as approved by the Engineer. This work shall include all necessary hardware to retrofit the cabinet to install the DSL communication modems in traffic control cabinet.

Specifications

The Contractor shall provide all materials required to successfully retrofit the existing traffic signal controller cabinet to house the DSL communications modem.

Measure and Payment

Each cabinet retrofit shall be paid for at the contract unit price of each. The price shall include the cost of all required labor, equipment and materials to retrofit the cabinet in the field and render the traffic VDS operational. This work includes all mounting hardware, and furnishing documentation to complete the work.

44. FURNISH AND INSTALL CONTROL CENTER EQUIPMENT – HARDWARE AND SOFTWARE:

General

Work under this item consists of furnishing and installing TMC equipment, including computer servers, modem(s), software, and LAN equipment and configuring the equipment for complete and functional operation by the Departments staff. Included in this item is the integration of all proposed and previously installed magnetic sensor equipment. The Contractor shall coordinate with DDOT on the locations of the existing magnetic sensor equipment.

Together the hardware and software shall be able to:

Access data from the proposed magnetic detectors installed under this contract.

Access the VDS in the field, utilizing the traffic signal communications network, issuing instructions for retrieving data and creating customized classification categories and reports.

Create summary data files (in .csv format) that can be sent to interested individuals and organizations via e-mail or directly accessed by them through an FTP site or an enhanced DDOT web site.

Summary data files shall be creatable for any specified time period, as specified by the software's schedule/calendar function.

The specified time period may be specified between a start time and an end time. The entry for time shall include calendar year, month, day, hour, min, and sec.

Provide automatic alarm notification based on configurable thresholds based on volume, speed or occupancy. Generate email alerts when network behavior exceeds user-defined thresholds.

Provide data access to remote clients through the server installed at the TMC. The remote users shall be able to establish a connection to the server, which in turn, establishes a connection to a designated access point.

The District Department of Transportation shall provide the Ethernet connection, the Ethernet switch and the ports required to configure the system to operate through DDOT's LAN System for access by the ITS Division staff at the Reeves Center located at 2000 14th St., N.W., Washington, D.C.

Materials

Materials shall consist of computer hardware and software to be supplied for the Departments staff. The equipment identified in this section shall provide the Departments with the capability of reading the raw data, editing the raw data, analyzing the data files, printing and plotting the data from these files, providing standard reports and archiving the data.

Computer Hardware and Software

The Contractor shall submit catalog cuts of all the equipment specified below to the Engineer for approval before purchasing the equipment that should be the same or functionally and compatibly comparable:

Servers

The Contractor shall provide two (2) mid-level servers to operate and maintain VDS located on the 2nd Floor of the Reeves Center located at 2000 14th St., N.W., Washington, D.C. and shall interface with the LAN Server over an Ethernet connection. The servers shall be approved by DDOT and each shall, at a minimum, meet the following requirements:

Server shall be rack mountable and no larger than 2U.

Dual Quad Core Intel® Xeon® Processors (TM) (or latest version), or functionally and compatibly comparable, based microprocessor running at a minimum clock speed of 3.6 GHz (or higher).

Fedora Core 10 or Red Hat Enterprise Linux 5.3 Operating system. The server may not be a virtual server. The server operating system shall be properly installed and configured. The server shall also include configured and installed MS Office Software package and approved DDOT virus protection software.

Fully configured to be placed on the DDOT network (adheres to all DDOT IT Standards and Guidelines.

4 GB RAM (minimum), upgradeable to a maximum 8 GB RAM.

1 TB Storage (minimum).

24X CD-RW/DVD Combo Drive with Cyberlink Power DVD™

Dual Ethernet ports

USB Quietkey keyboard and USB 2 button Mouse with wheel

Rack mountable matrix LCD color VGA display, capable of displaying true colors a minimum resolution of 1080 pixels by 1024 lines.

Built-in 56k fax/data modem.

Complete manufacturer's original documentation including system configuration and diagnostics software.

One set of manufacturer's original CD-ROM and all hardware and software manuals shall be included. Software licenses for all "off-the-shelf" software furnished with the server shall be included.

Each server shall run the data collection software for the field equipment and interface with those detectors included in this project.

Communication Modems

The Contractor shall provide modems (in a cabinet chassis version) to communicate between each traffic signal cabinet and the TMC. The modems shall be compatible with the Departments Traffic Signal Communications Network, and shall be the same as Pay Item 800 015. The Contractor may substitute a chassis version of the DSL modem at the TMC, as long as it meets or exceeds the requirements in Pay Item 800 015. The Contractor shall include an additional 15 DSL modem chassis cards, as part of this item. Written approval by DDOT Engineer is required for this option. Prior to purchase, all modems shall be approved by the COTR.

VDS Intersection Locations

Name	Locations
ACISA1006 APEG8547	12th Street Bet Constitution Ave & Independence Ave. NW
ACISA1008 APEG6672	Constitution Ave Bet 12th & 14th Streets, NW
ACISA1012 APEG8592	14th Street Bet F & G Streets, NW
ACISA1017 APEG6662	L Street Bet 14th & 15th Streets, NW
ACISA1025 APEG8590	14th Street Bet R & S Streets, NW
ACISA1031 APEG6675	15th Street between Constitution Ave and Pennsylvania Ave, NW
ACISA1065 APEG8588	17th Street Bet Constitution Avenue & C Street, NW
ACISA1083 APEG8593	U St Bet 17th & 18th St, NW
ACISA1099 APEG6657	New Hampshire Ave Bet Q & Corcoran Streets, NW
ACISA1104 APEG8589	Constitution Ave Bet 19th & 20th Streets, NW (WB)
ACISA1106 APEG8579	E Street (North), Bet 19th & 20th Streets, NW
ACISA1112 APEG8557	19th Street between K and L Streets NW
ACISA1116 APEG9675	Connecticut Avenue & R Street, NW
ACISA1117 APEG9654	Constitution Ave Bet 19th & 20th Streets, N.W. (EB)
ACISA1118 APEG8555	E Street (South) Bet 19th & 20th Streets, NW
ACISA1129 APEG8616	Pennsylvania Ave Bet 19th & 20th Streets, NW
ACISA1144 APEG9672	Connecticut Avenue & S Street, NW
ACISA1146 APEG8556	Constitution Ave Bet 22nd & 23rd Streets, NW
ACISA1153 APEG8584	Massachusetts Ave Bet 22nd Street, Florida Ave & 23rd Street, NW
ACISA1159 APEG8548	23rd St bet I St and Washington Circle, NW
ACISA1163 APEG8562	P Street, Bet Rock Creek Pkwy & 23rd Street, NW
ACISA1169 APEG6678	25th & K Streets, NW
ACISA1176 APEG8619	Connecticut Ave Bet L & K Streets, NW
ACISA1179 APEG8613	Connecticut Ave & T Street, NW
ACISA1181 APEG9671	Connecticut Avenue & Kalorama Road, NW
ACISA1187 APEG8550	Virginia Ave Bet New Hampshire Ave & 24th Street, NW
ACISA1208 APEG8621	Independence between 6th and 7th Street, SW
ACISA1227 APEG8615	Independence Ave & 23rd Street, SW
ACISA1237 APEG8560	Whitehurst Freeway between 27th Street and M Street
ACISA2022 APEG6694	3rd Street Bet Madison Dr. & Pennsylvania Ave., NW
ACISA2037 APEG8559	9th St bet Pennsylvania Ave. and Constitution Ave, NW
ACISA2041 APEG8549	E Street Bet 6th & 7th Streets, NW
ACISA2043 APEG8587	6th Street Bet G Street & G Place NW
ACISA2047 APEG9674	New York Avenue & 6th Street, NW
ACISA2057 APEG6693	7th Street between G Street and H Street, NW
ACISA2066 APEG8573	Pennsylvania Avenue between 14th St and 3rd St. NW
ACISA2090 APEG6658	H Street Bet 10th & 11th Streets, NW
ACISA2095 APEG8558	Mass Ave NW Bet 9th & 10th Streets, NW
ACISA2096 APEG9673	New York Avenue & 10th Street, NW
ACISA2120 APEG6674	12th Street Bet H Street & New York Avenue, NW
ACISA2135 APEG8614	New York Ave Bet H & I Streets, NW
ACISA2156 APEG8546	Vermont Ave Bet V & U St, NW
ACISA3026 APEG8574	7th Street Bet S & R Streets, NW
ACISA3028 APEG8561	New Jersey Ave Bet. Rhode Island Ave & R Street, NW
ACISA5025 APEG6661	Florida Ave Bet 10th & 11th St, NW
ACISA5035 APEG8552	13th St Bet Euclid & Fairmont St, NW
ACISA5043 APEG8565	13th St Bet Jefferson St & Kennedy St, NW

Name	Locations
ACISA5057 APEG8586	14th St Bet Euclid & Fairmont St, NW
ACISA5067 APEG9662	14th St & Park Rd, NW
ACISA5088 APEG8564	16th St Bet Euclid & Fuller St, NW
ACISA5089 APEG8578	Florida Ave Bet 16th & 17th St, NW
ACISA5095 APEG6687	16th St Bet Kennedy St & Morrow Dr, NW
ACISA5130 APEG8554	Georgia Ave Bet Harvard & Gresham Pl, NW
ACISA5142 APEG8580	Georgia Ave Bet Sheridan & Tuckerman St, NW
ACISA5159 APEG8570	New Hampshire Ave Bet Webster & Allison St, NW
ACISA5162 APEG8582	Piney Branch Rd Bet Blair Rd & Eastern Ave, NW
ACISA5169 APEG9647	Sherman Ave bet Euclid St and Barry Pl, NW
ACISA5198 APEG6660	Kansas Ave Bet Chillum Pl & Sheridan St, NE
ACISA6006 APEG8600	Military Rd Bet Oregon Ave & 27th St NW
ACISA6034 APEG9650	38th St & Reservoir Rd, NW
ACISA6051 APEG8595	Massachusetts Ave Bet 49th St & Western Ave, NW
ACISA6062 APEG9651	Connecticut Avenue & Albemarle Street, NW
ACISA6063 APEG8597	Connecticut Ave Bet Chesapeake St & Brandywine NW
ACISA6068 APEG8608	Connecticut Avenue & Fessenden Street, NW
ACISA6071 APEG8607	Connecticut Avenue & Livingston Street, NW
ACISA6072 APEG8604	Connecticut Ave Bet Macomb & Ordway Streets, NW
ACISA6081 APEG8605	Connecticut Avenue & Tilden Street, NW
ACISA6083 APEG6669	Connecticut Avenue & Veazey Terrace, NW
ACISA6084 APEG8581	Connecticut Avenue & Woodley Road, NW
ACISA6088 APEG6676	Connecticut Avenue & Entrance to Zoo, NW
ACISA6089 ACISA8596	Foxhall Rd Bet Garfield St & Whitehaven Pkwy, NW
ACISA6097 APEG8568	MacArthur Blvd Bet Loughboro & Little Rd, NW
ACISA6099 APEG6683	Reservoir Rd Bet Foxhall Rd & Macarthur Blvd, NW
ACISA6115 APEG6679	Nebraska Ave Bet Connecticut Ave & Jenifer Street, NW
ACISA6125 APEG8583	Reno Rd Bet Tilden & Van Ness St, NW
ACISA6128 APEG6659	River Rd Bet 46th St & Western Ave, NW
ACISA6142 APEG8553	M St Bet Wisconsin Ave and 31st St, NW
ACISA6144 APEG6686	Wisconsin Ave Bet Massachusetts Ave & Garfield Ave, NW
ACISA6147 APEG8612	Wisconsin Ave Bet P & Q St, NW
ACISA6152 APEG8576	Wisconsin Ave Bet Van Ness & Yuma St, NW
ACISA1210 APEG8620	7th Street E/B Ramp to SW Freeway
ACISA2006 APEG9661	First Street & H Street, NW
ACISA2020 APEG8591	3rd St on-ramp to I-395 SB NW
ACISA2161 APEG6663	K Street Bet North Capitol & 1st Streets, NE
ACISA2193 APEG8617	M St Bet 4th & 6th St, SW
ACISA2226 APEG8618	South Capitol St Bet G St & I St, NE
ACISA2249 ACISA6666	M St Bet Isaac Hull Ave and 8th St, SE
ACISA2250 APEG6668	North Capitol Street Bet G Street & G Pl, NE
ACISA3002 APEG9653	New York Avenue & First Street, NW
ACISA3035 APEG6689	Rhode Island Ave Bet Lincoln & N. Capitol Streets, NE
ACISA3037 APEG6691	North Capitol Street between Florida Avenue & P Street
ACISA3039 APEG9652	New York Avenue & N. Capitol St, NE
ACISA3050 APEG8610	Mass. Ave Bet 2nd & 3rd Streets, NE
ACISA3052 APEG6677	H Street Bet 3rd & 4th Streets, NE
ACISA3056 APEG6667	Constitution Ave Bet 3rd & 4th Streets, NE

Name	Locations
ACISA3097 APEG8609	Maryland Ave Bet. 10th & 11th Streets, NE
ACISA3099 APEG8567	Florida Ave Bet 11th St & 12th St NE
ACISA3115 APEG6670	North Carolina Ave Bet. 14th & 15th Streets, NE
ACISA3129 APEG6680	Benning Rd Bet 18th St & 19th St. N.E.
ACISA3140 APEG8572	Bladensburg Road Bet Earl Pl. & Eastern Ave, NE
ACISA3164 APEG8575	Michigan Ave Bet Allison Street and Eastern Avenue, NE
ACISA3177 APEG8566	Mt. Olivet Road between Brentwood Parkway & West Virginia Ave NE
ACISA3178 APEG6685	New York Ave Bet Florida Ave & Penn Street, NE
ACISA3179 APEG6695	New York Avenue & 16th Street, NE
ACISA3180 APEG6682	New York Ave. & Bladensburg Road, NE
ACISA3183 APEG9649	New York Avenue & Kendall Street, NE
ACISA3189 APEG6684	Rhode Island Ave Bet 14th & 15th Streets, NE
ACISA3198 APEG8577	Sargent Road Bet Eastern Ave. & Galloway St, NE
ACISA3206 APEG6681	South Dakota Ave Bet 12th & Delafield Streets, NE
ACISA3210 APEG8563	S. Dakota Ave Bet Newton St & Monroe St NE
ACISA3224 APEG8602	East Capitol Street Bet 18th & 19th Streets NE
ACISA3231 APEG6664	Michigan Ave Bet 4th St & Monroe St, NE
ACISA4018 APEG6692	Pennsylvania Ave Bet. 5th & 6th Streets, SE
ACISA4055 APEG8551	Independence Ave Bet 19th St & RFK Stadium, SE
ACISA4063 APEG6671	East Capitol Street Bet 3rd & 4th Streets, SE
ACISA4073 APEG8606	N.H. Burroughs Ave Bet 44th Street & Minnesota Ave, NE
ACISA4076 APEG9659	Nannie Helen Burroughs Ave & 58th St, NE
ACISA4085 APEG8598	Sheriff Rd Bet 45th & 49th St, NE
ACISA4103 APEG7335	Branch Ave Bet Southern Ave & Camden, SE
ACISA4105 APEG6647	Alabama Ave Bet Wheeler Road & Randle Place, SE
ACISA4112 APEG7331	Benning Rd Bet H St & G St, SE
ACISA4119 APEG8601	Good Hope Rd Bet Minnesota Ave & 15th SE
ACISA4121 APEG8603	Howard Road Bet S Capitol Street & Firth Sterling Avenue SE
ACISA4126 APEG6650	Martin Luther King Jr Ave Bet Raleigh Place & Newcomb, SE
ACISA4130 APEG6649	MLK Ave Bet Savannah St & Highview Pl SE
ACISA4131 APEG6688	Martin Luther King Jr Ave Bet W Street & Good Hope Road, SE
ACISA4137 APEG8611	Minnesota Ave Bet Randle Circle & M Street, SE
ACISA4139 APEG9660	30th Street & Naylor Road, SE
ACISA4142 APEG6651	Penn Ave Bet Branch Ave and 30th St SE
ACISA4149 APEG6655	Bowen Rd between Ridge Road and Mass Ave, SE
ACISA4150 APEG7332	23rd Street & Southern Ave, SE
ACISA4152 APEG7333	Central Ave Bet Southern Ave & 56th St, SE
ACISA4153 APEG7336	Chesapeake Street Bet 6th Street & Southern Ave, SE
ACISA4157 APEG7334	Suitland Road Bet Southern Ave & 38th Street, SE
ACISA4165 APEG7338	Wheeler Road Bet Barnaby Street & Southern Ave, SE
ACISA4177 APEG6654	E. Capitol St Bet 58th & 61st St, SE
ACISA4178 APEG6656	Benning Rd Bet 44th St & East Capitol St, NE
ACISA4189 APEG6652	South Capitol Street Bet Livingston & Southern Ave SE
ACISA4196 APEG6653	Suitland Parkway at Stanton Rd, SE
ACISA4229 APEG8599	Minnesota Ave between 16th Street and S Street, SE
ACISA5002 APEG8569	Irving St Bet First & Kenyon St, NW
ACISA5186 APEG8585	Riggs Rd Bet 1st Pl & 1st St, NE

