Illinois Department of Transportation
2300 South Dirksen Parkway / Springfield, Illinois / 62764

January 5, 2026

SUBJECT FAI Route 290(I-290)
Project NHPP-5D61(451)
Section 2019-191-B-R
Cook County
Contract No. 62K64

Item No. 022, January 16, 2026, Letting
Addendum B

NOTICE TO PROSPECTIVE BIDDERS:

Attached is an addendum to the plans or proposal. This addendum involves revised and/or added material.

1. Revised the Schedule of Prices.
2. Revised pages i-vi of the Table of Contents of the Special Provisions.
3. Revised pages 209-211 of the Special Provisions.
4. Added pages 477-487 to the Special Provisions
5. Revised sheets 5-23, 39, 43, 45, 68, 114, 116, 125, 128, 137, and 152 of the Plans.

Prime contractors must utilize the enclosed material when preparing their bid and must include any changes to the Schedule of Prices in their bid.

Very truly yours,

Jack A. Elston, P.E.
Bureau Chief, Design and Environment

MTS

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Materials. The material of the post shall meet the requirements of Material Specification 1385 and of Standard Drawing 526.

General Requirements. The post and base shall be mounted on the foundation so that the handhole faces away from the curb. The nuts on the foundation shall be tightened to secure the post to the foundation such that there is no space separating the post from the foundation. There shall be no double nutting. The post shall be plumb; the use of shims shall not be permitted. The post cap shall be secured by three 5/16-18 x 3/4" hex head stainless steel set screws. The height of the post shall be as indicated on the plans.

Basis of Payment. This work shall be paid for at the contract unit price per each for TRAFFIC SIGNAL POST, ALUMINUM of the height noted.

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~~MAST ARM, STEEL, MONOTUBE, 20 FOOT (CITY OF CHICAGO)~~

~~DESCRIPTION. This item will consist of furnishing and installing a steel, monotube, mast arm for the purpose of supporting traffic signals, and/or illuminated signs on an anchor base pole at the locations shown on the plans, or as specified or directed by the Commissioner. The length of the mast arm and the angular orientation of the arm relative to the centerline of the roadway will be as indicated on the plans.~~

~~A mast arm must be installed only on a 3 gauge pole, and the length of the mast arm will govern the minimum base diameter of the pole on which the arm is to be installed, in accordance with the following chart:~~

~~MAST ARM LENGTH (feet)~~	~~POLE BASE DIAMETER (inches)~~
~~16~~	~~10~~
~~20~~	~~10~~
~~26~~	~~10~~
~~30~~	~~11~~
~~35~~	~~12.5~~
~~40~~	~~12.5~~
~~44~~	~~12.5~~

~~MATERIAL. The mast arm must be 7 gauge steel meeting the requirements of Standard Drawing 870 and Material Specification 1454.~~

~~INSTALLATION. The mast arm must be mounted on the pole at the height specified on Drawing 834, or at a different height if specified on the plans, or as directed by the Engineer. A one inch (1") diameter opening for the installation of cable must be field drilled in the pole in line with the orientation of the mast arm. The hole must be reamed or filed to remove all sharp edges or burrs which might damage cable during installation, or through vibration when the signals are in operation. A neoprene grommet must be inserted into the finished hole prior to the installation of the cable.~~

Revised 1-3-2026

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Two holes must be field drilled in the pole at 180 degrees relative to the orientation of the pole for installation of locator shear pins, provided with the back plate, to prevent rotation of the mast arm. These holes must be drilled after the mast arm is in place in order that the position of the holes will match the location of the locator bushings attached to the back half of the clamp.

All signals, signs, and electrical equipment must be attached in the correct relative position to the mast arm, with service cord in place, prepared to be installed on the pole, prior to the attachment of the mast arm to the pole. The installation of the cord in the pole must be coordinated with the attachment of the mast arm to the pole. The clamp bolts must be tightened securely so that there is no slippage of the mast arm either upward or downward to exert a vertical force on the shear pins. The end capmust be secured in place with the attachment screws provided.

The mast arm must be delivered completely finished with a factory applied black powder coat per Material Specification 1454. The contractor must utilize non-abrasive slinging materials and must otherwise exercise due care in erecting the pole and mast arm to prevent any damage to the finish.

METHOD OF MEASUREMENT. This work will be measured per each monotube arm installed on a traffic pole.

BASIS OF PAYMENT. This work will be paid for at the contract unit price for each MAST ARM, STEEL, MONOTUBE of the length indicated, and will be payment in full for furnishing and installing a steel mast arm in place, complete. Attachment of signals and signs will not be part of this pay item.

MAST ARM, STEEL, MONOTUBE, 26 FOOT OR 30 FOOT (CITY OF CHICAGO)

DESCRIPTION. This item will consist of furnishing and installing a steel, monotube, mast arm for the purpose of supporting traffic signals, and/or illuminated signs on an anchor base pole at the locations shown on the plans, or as specified or directed by the Commissioner. The length of the mast arm and the angular orientation of the arm relative to the centerline of the roadway will be as indicated on the plans.

A mast arm must be installed only on a 3 gauge pole, and the length of the mast arm will govern the minimum base diameter of the pole on which the arm is to be installed, in accordance with the following chart:

MAST ARM LENGTH (feet)	POLE BASE DIAMETER (inches)
16	10
20	10
26	10
30	11
35	12.5
40	12.5
44	12.5

2

~~MATERIAL. The mast arm must be 7 gauge steel meeting the requirements of Standard Drawing 870 and Material Specification 1454.~~

~~INSTALLATION. The mast arm must be mounted on the pole at the height specified on Drawing 834, or at a different height if specified on the plans, or as directed by the Engineer. A one inch (1") diameter opening for the installation of cable must be field drilled in the pole in line with the orientation of the mast arm. The hole must be reamed or filed to remove all sharp edges or burrs which might damage cable during installation, or through vibration when the signals are in operation. A neoprene grommet must be inserted into the finished hole prior to the installation of the cable.~~

~~Two holes must be field drilled in the pole at 180 degrees relative to the orientation of the pole for installation of locator shear pins, provided with the back plate, to prevent rotation of the mast arm. These holes must be drilled after the mast arm is in place in order that the position of the holes will match the location of the locator bushings attached to the back half of the clamp.~~

~~All signals, signs, and electrical equipment must be attached in the correct relative position to the mast arm, with service cord in place, prepared to be installed on the pole, prior to the attachment of the mast arm to the pole. The installation of the cord in the pole must be coordinated with the attachment of the mast arm to the pole. The clamp bolts must be tightened securely so that there is no slippage of the mast arm either upward or downward to exert a vertical force on the shear pins. The end capmust be secured in place with the attachment screws provided.~~

~~The mast arm must be delivered completely finished with a factory applied black powder coat per Material Specification 1454. The contractor must utilize non-abrasive slinging materials and must otherwise exercise due care in erecting the pole and mast arm to prevent any damage to the finish.~~

~~METHOD OF MEASUREMENT. This work will be measured per each monotube arm installed on a traffic pole.~~

~~BASIS OF PAYMENT. This work will be paid for at the contract unit price for each MAST ARM, STEEL, MONOTUBE of the length indicated, and will be payment in full for furnishing and installing a steel mast arm in place, complete. Attachment of signals and signs will not be part of this pay item.~~

2

CELLULAR MODEM FOR TRAFFIC SIGNALS

1. SUBJECT

This specification states the requirements for a cellular modem to be used as a wireless cellular two-way communication link between the traffic signal controller, video detection camera, and other traffic devices at an intersection and a remote computer or computers. The cellular modem will allow monitoring of the intersection controller, real time video, traffic counts, etc. Remote programming of the modem, the controller, video detection, and other traffic equipment shall also be provided. The modem shall be physically located in a traffic signal control cabinet.

2. GENERAL

2.1 Specifications. The modem shall conform in detail to the requirements herein stated and to the latest referenced specifications of the following organizations:

Institute of Electrical and Electronics Engineers (IEEE)
International Electromechanical Commission (IEC)
National Electrical Manufacturers Association (NEMA)
Underwriters Laboratories (UL)

2.2 Acceptance. The modem model shall be approved by the selected wireless carrier for use on their network. A modem not conforming to this specification will not be accepted.

2.3 Sample. If requested by the Chief Procurement Officer, a sample of the modem intended to be provided under this specification, shall be submitted to the Division of Electrical Operations within fifteen (15) business days after receipt of the request.

2.4 Warranty. The manufacturer shall warrant the modem against defects in material and workmanship for a period of five (5) years after City acceptance. The manufacturer shall provide a replacement of any failed modem at no cost to the City.

2.5 Support.

1. Support shall include software updates and phone support, Monday through Friday, 7:00 AM to 7:00 PM, for the duration of the warranty period.

2.6 License.

1. The modem shall include licensed software use and full maintenance and support services for the software for a minimum period of 10 years from the date of the City's official receipt for commodity contracts or from the date of City's final written acceptance for construction contracts.

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2. The software license shall be fully transferable to CDOT. Transfer shall be completed upon purchase for commodity contracts and prior to City's final written acceptance for construction contracts.
3. The software license provided by the vendor shall be subject to the City of Chicago Data Protection Requirements for Contractors, Vendors and Third Parties. A copy of this document is provided in the Appendix.
4. In no event shall the software license include an obligation by the licensee to indemnify the licensor.
5. Written evidence of the transfer shall be certified by an authorized representative of the software vendor and provided to the City.
6. The software license shall grant the City full use of the Web-based software including access to the data collected by the modem. The capabilities of the software may be enhanced but shall not be reduced.

2.7 Documentation. The modem shall include the manufacturer's installation and operations manuals in hardcopy and electronic PDF formats.

3. GENERAL FUNCTIONS

3.1 Support Virtual Private Network (VPN) connections

3.2 Support firewall capabilities, such as, Internet Protocol (IP) block/allow listings

3.3 Provide an "always-on" connection, without dialing

3.4 Support local and remote management

3.5 Domain name addressable

3.6 Port Filtering

3.7 Generic Routing Encapsulation (GRE) Tunneling

3.8 IP Filtering

3.9 Media Access Control (MAC) Address Filtering

3.10 SIM card shall have a static IP address assigned by DoIT, and shall be provisioned on the City's cellular provider's (currently Verizon) private network.

4. PORT REQUIREMENTS

4.1 Modem transceiver shall support full duplex operation.

4.2 The modem shall be static IP addressable.

4.3 Frequency Band and Cellular Network Interface.

1. Fourth Generation (4G) Long Term Evolution (LTE) models:

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a. Tri-band support for 700/1900/2100 megahertz (MHz)

b. Backward compatible with: evolved High Speed Packet Access (HSPA+), High Speed Packet Access (HSPA), Enhanced Data-rates for GSM Evolution (EDGE), and General Packet Radio Service (GPRS).

c. LTE auto-fallback to GSM / HSPA.

2. 3G HSPA+ models:

a. Tri-band support for 850/1900/2100 MHz or quad-band support for 850/900/1800/1900 MHz

b. Backward compatible with: HSPA, universal mobile telecommunications system (UMTS), EDGE, GPRS, and Global System for Mobile communications (GSM).

5. ETHERNET INTERFACES

5.1 Support Transmission Control Protocol (TCP)/IP and User Datagram Protocol (UDP)/IP.

5.2 A minimum of two registered Jacks (RJ)-45, IEEE 802.3 standard 10 Base-T Ethernet port for 3G cellular modems and 100 Base-TX Ethernet ports for 4G modems.

5.3 For each RJ-45 port, include a pre-terminated 6-foot Category 6 network cable that is Electronic Industries Alliance (EIA)/Telecommunications Industry Association (TIA)-568-A compliant.

6. ANTENNA

6.1 Omnidirectional external antenna rated for outdoor use and fully compatible with the modem in accordance with manufacturer specifications.

6.2 Antenna shall be vandal resistant and low profile.

6.3 Antenna shall be able to be easily mounted to cabinet. All mounting hardware shall be included.

6.4 50-Ohm Sub Miniature version A (SMA) male connector.

6.5 Include a 9-foot coax antenna cable(s) with required pre-terminated adapters (SMA) per the manufacturer's recommendation.

6.6 Minimum Antenna gain of 2 decibels relative (dBi).

6.7 2 antenna elements with operating Frequencies of 698-896 and 1700-2700 MHz.

7. POWER SUPPLY

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Include compatible power supply and connections as recommended by the modem manufacturer.

8. MOUNTING REQUIREMENTS

Include mounting hardware to securely mount the modem in the cabinet.

9. ENVIRONMENTAL

9.1 Operating temperature for the modem and all associated field components shall be -22° F to 158° F.

9.2 Storage temperature for the modem and all associated field components shall be -22° F to 158° F.

9.3 The modem and all associated field components shall operate in relative humidity of 5 percent to 95 percent non-condensing.

10. MANAGEMENT, SECURITY AND DIAGNOSTICS

10.1 Support real-time 2-way communications for remote management and shall include management software by the modem manufacturer.

10.2 Light-emitting diode (LED) indicators for Ethernet, power, cellular link/activity and signal strength.

10.3 Support signals for Transmit Data (TXD), Receive Data (RXD), Request To Send (RTS), Clear To Send (CTS), Data Terminal Ready (DTR), Data Set Ready (DSR), Data Carrier Detect (DCD) and hardware and software flow control.

10.4 Compatibility with Hypertext Transfer Protocol (HTTP)/HTTP Secure (HTTPS), Dynamic Host Communications Protocol (DHCP), Simple Network Management Protocol (SNMP) v2 or v3, Simple Mail Transfer Protocol (SMTP), Secure Socket Layer (SSL), Secure Shell (SSH)-2.

10.5 Web-based Graphical User Interface (GUI).

10.6 Command Line Interface (CLI) access via TELNET connection.

10.7 SNMP Management Information Base (MIB)-II and SNMP Traps.

11. SHIPPING

Each cellular modem, antenna, power supply, and cables shall be packed so as to provide protection in shipping. Packing shall be labeled indicating contents and shall include the manufacturer and model numbers.

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PEDESTRIAN PUSH BUTTON POST (5') (CDOT)

Effective: June 6, 2024

Description. The following CDOT Division of Electrical Operations (DEO) material specifications and standard drawings are applicable to this work.

Material Specifications: 1462
Standard Drawings: 963

This item shall consist of furnishing and installing a steel post to support a pedestrian push button in a concrete sidewalk at the location shown on the plans, or as directed by the Engineer. The post installation shall be in accordance with Standard Drawing 963 entitled "Pedestrian Push Button Post".

Materials. The post shall be three inch (3") galvanized rigid steel conduit meeting the requirements of Material Specification 1462. The top of the post shall be threaded for a length of two inches (2"). The bottom of the post shall be threaded for a length of three and one-half inches (3.5"). A threaded conduit cap shall be provided for the top. The base material shall consist of a three and one-half inch (3.5") length of threaded conduit coupling circumferentially welded to a base plate. The base plate shall be dimensioned as shown on Standard Drawing 963. The base plate shall be made of a high strength low alloy steel meeting the requirements of ASTM A595, Grade A. The post, base, and cap shall be powder coated black. Post threads shall not be painted.

General Requirements. A hole shall be drilled into the post at the proper height and location for the pedestrian push button wiring. The post shall be screwed into the base. The post may be tack welded to the base to insure the two parts do not loosen. The post and base shall be mounted in the sidewalk using a minimum of ½" concrete anchors of the appropriate length. Cable shall be pulled into the post before the post is mounted to the sidewalk. The nuts on the rods shall be tightened to secure the post to the sidewalk such that there is no space separating the post from the sidewalk. There shall be no double nutting. The post shall be plumb; the use of shims shall not be permitted. The post cap shall be secured by screwing into the top of the pipe. After the post is erected, the Engineer shall determine if touch-up paint is required.

Basis of Payment. This work will be paid for at the contract unit price per each for PEDESTRIAN PUSH BUTTON POST (5').

Revised 1-3-2026

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INTERSECTION TECHNOLOGY ENHANCEMENTS (CDOT)

Effective: June 5, 2024
Revised: June 3, 2025

Description. The following CDOT Division of Electrical Operations (DEO) material specifications and standard drawings are applicable to this work.

Material Specifications: 1620, 1622
Standard Drawings: None

This work shall consist of furnishing, installing, integration, and testing a set of environmentally hardened communications node equipment at a signalized intersection. The equipment shall collectively interface with the traffic signal controller, enable remote monitoring of the traffic and signal operations, and provide network connectivity.

Materials. Equipment shall meet the requirements of Material Specification 1620 and 1622.

General Requirements. The Intersection Technology Enhancements (ITE) shall have video detection (camera) and Data and Communications Node (DCN) comprising of web interface, video processing software, data storage, and input/output interfaces. The DCN shall include multiple backhaul communications options including Ethernet over hardwired copper or fiber cabling and cellular communications backhaul. The node shall support full control of the intersection hardware including the remote management and control of the traffic signal controller.

Fiber backhaul requires coordination with the Chicago Office of Emergency Management and Communications (OEMC) to complete an end-to-end communications link between field device locations and the Chicago Traffic Management Center (TMC).

Cellular backhaul requires service coordination with the Chicago Department of Technology and Innovation and Technology (DTI) to complete an end-to-end, broadband cellular communications link between field device locations and the Chicago TMC. The cellular modem may be a separate unit or integrated into the intersection communications node. In either case, the cellular modem, establishing cellular service in DTI's name, installation, and coordination requirements shall be as required in the special provision for Cellular Modem.

The communications node shall be provided with all required components, including power supply, cables, mounting hardware, and all accessories required to make the system fully operational in accordance with these specifications. The camera shall be mounted to at a height that allows full visibility of the intersection as required to achieve the performance requirements of this special provision. If additional cameras, mounting arms, or cabling are required to achieve the detection accuracy requirements specified herein, they shall be furnished and installed at no additional cost beyond the original bid price.

The ITE shall be forward compatible to support connected vehicle technology including, but not limited to Dedicated Short Range Communications (DSRC) and adaptive traffic signal controls.

Final equipment selection, procurement, and provisioning shall be coordinated with DTI and

COOT. Identical and completely interchangeable equipment shall be used at each field location.

2

All equipment shall include the manufacturer's installation and operations manuals in hardcopy and electronic PDF formats.

The contractor shall provide documentation of the exact equipment model and serial numbers in hardcopy and electronic PDF formats.

Construction Requirements.

General

1. Installation shall be done in accordance with manufacturer recommendations.

2. Contractor shall securely mount the intersection communications node equipment inside the signal cabinet in designated locations as shown on the plans.

3. Contractor shall securely mount the video detection camera(s) to the designated city infrastructure and route cabling within city raceways as shown on the plans. Drip loops shall be used for all exposed cabling.

4. Cabling length shall remain within required Ethernet and serial communications limits. Cable slack shall be provided at pull points and at the cabinet for maintenance access of equipment.

5. If an integrated cellular modem is used, the Contractor shall perform the associated survey and installation work as specified in the Cellular Modem special provision. Contractor shall neatly route and secure all cabling within the cabinet.

6. Contractor shall configure the communications node equipment with enabled security and interoperability within the existing City network as directed by the Engineer, including VPN settings and local IP address. Administrative account login credentials shall be provided to the Engineer.

7. Contractor shall provide field troubleshooting support during integration and testing by the CDOT Advanced Traffic Management System (ATMS) administrator.

Integration

1. Contractor shall develop a Device Integration Plan (DIP) and submit it to the Engineer for approval at least 14 days prior to field installation. Equipment shop drawing approvals shall be obtained prior to submitting the DIP.

2. The Contractor shall contact the original equipment manufacturer (OEM) and the CDOT ATMS administrator to facilitate the sharing of device information. Contractor shall obtain recommendations and support services from these parties and incorporate them into the DIP.

3. Contractor shall set up a bench test if recommended by the equipment manufacturer or CDOT ATMS administrator. Configuration support is to be provided by the OEM, their representative, or the and CDOT ATMS administrator with support from the OEM. Location of the bench test shall be proposed by the Contractor for approval by the Engineer.

4. Contractor shall coordinate with CDOT Division of Electrical Operations (DEO) for all work affecting existing city infrastructure and equipment.

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5. The DIP shall include the following:

   a. Updated communications node locations and layouts inside cabinets
   b. Current device communications interconnect schematics
   c. Proposed technical steps for integration and validation
   d. Configuration settings for each communications interface for each equipment

6. Support from the OEM shall include on-site installation guidance, equipment configuration settings, and troubleshooting. Physical installation work shall be performed by the Contractor.

7. Support from the CDOT ATMS administrator shall include modifications and software programming necessary to integrate the data from the DCN equipment.

8. Contractor shall provide field support for equipment at the intersection and shall coordinate with the CDOT traffic signal management software vendor, Kapsch, and the CDOT ATMS administrator to assist with integration.

Acceptance Testing

1. Contractor shall develop an Acceptance Test Plan (ATP) and submit it to the Engineer for approval. The Contractor shall obtain the recommendations from the equipment manufacturer and CDOT ATMS administrator and incorporate them in the ATP.

2. The ATP shall document detailed steps to verify each required functional performance of the equipment.

3. The ATP shall include checklists for each test. Each checklist item shall have defined pass/fail criteria with a reserved space to record the results.

4. Corrective actions shall be documented in detail on checklist forms.

5. Testing shall be witnessed by representatives of the Contractor and the Engineer.

6. Each checklist shall include areas for signatures by representatives of the Contractor's representative and the Engineer's representative. Completed checklists shall be provided to the Engineer in hardcopy and electronic PDF formats.

7. The ATP shall include three levels of testing:

   a. Local – Verification that each individual equipment of the ITE is installed and functioning properly. A City (DTI) provided SIM card is installed in the DCN and the DCN is communicating with the OEM's cloud server and the City networks. The detection zones are configured in the DCN and vehicles/ped actuation detection is working correctly. All approaches of the intersection shall be clearly visible on the video camera.

   b. Subsystem – Verification that connected field devices are properly communicating with the DCN and the signal controller. The signal controller shall be receiving the detections from the ITE and the DCN shall be receiving the signal phasing data (telemetry) from the controller.

   c. System – Verification that the connected field devices are properly configured and communicating with the Chicago ATMS, central signal software. ATMS Administrator

shall be able to access the signal controller's website through the DCN. ATMS shall receive detection data from the OEM's portal, OEM's portal shall display signal telemetry, live and historical video, traffic counts, and signal performance measures. 2

8. The Contractor shall submit to the Engineer a proposed schedule for conducting the approved ATP.
9. The Contractor shall conduct pre-testing to confirm equipment readiness before the formal acceptance testing takes place.
10. After all levels of testing are successfully completed and accepted by the Engineer, there shall be a 60-day burn-in period to verify the continuous and stable operation of the DCN and continued achievement of accuracy requirements.
    a. The Contractor shall document all failures, including description, date, time, and location of each occurrence. The written documentation shall be provided to the Engineer.
    b. Major failures shall require the restarting of the 60-day burn-in period following the correction of the issue. Major failures shall include those that involve more than 48 hours to resolve the issue or frequent recurrence of minor failures as determined by the Engineer.
    c. Minor failures shall require the pausing of the 60-day burn-in period until the issue is resolved; then resuming the 60-day burn-in period.

Licensing

1. The Contractor shall submit a sample license document from the OEM along with the material submission.
2. The license document shall be approved by the Engineer.
3. The license document shall adhere to the licensing requirement in the Material Specification 1620 and shall bear the OEM's seal and signature for authentication.
4. The Contractor shall work with the OEM to make changes to the licensing document as required by the Engineer.
5. The license document shall state that the OEM will adhere to the City of Chicago's Data Protection Requirements (Material Spec 1620 Exhibit 1).
6. The Contractor shall provide a separate license document from the OEM for each ITE installation.

Basis of Payment. This work will be paid for at the contract unit price per each for INTERSECTION TECHNOLOGY ENHANCEMENTS, which price will be payment in full for furnishing and installing the communications node equipment complete and fully operational for three years with all necessary cameras, cables, modems, hardware, accessories, components, coordination with and payments to cellular service provider as applicable, with all wiring and connections as specified herein.

2

POLE STEEL, ANCHOR BASE, 12.5" DIA. 3 GAUGE, 34'-6"

DESCRIPTION. This item will consist of furnishing, installing, and setting plumb a steel anchor base pole to which equipment may be attached for the extension of the City street light and traffic signal systems.

MATERIAL. The material of the pole must meet the requirements of Material Specification 1447.

INSTALLATION. The pole must be installed on the concrete foundation designed for the particular pole usage as indicated on the plans or as directed by the Engineer. Double nut construction must be used as shown on Drawing 837. Double nut construction provides the proper ventilation, as well as providing a way to plumb the pole. Any exposed portions of anchor rods extending above the nuts which interfere with the installation of the bolt covers must be cut off to provide the necessary clearance. The excess must not be burned off. The pole must be set secure, properly orientated, and plumb using the nuts and washers provided with the anchor bolts. The bolt covers, handhole cover, and pole cap must be securely attached.

The contractor will utilize non-abrasive slinging materials and will otherwise exercise due care in erecting the pole and mast arm to minimize any possible damage to the finish. When necessary, the contractor will utilize, at his own expense, factory approved touch-up materials and methods to restore the finish to like new appearance and durability.

METHOD OF MEASUREMENT. This item will be measured per each unit installed, complete with anchor bolt covers, pole cap, and handhole cover.

BASIS OF PAYMENT. This work will be paid for at the Contract unit price each for a POLE, STEEL, ANCHOR BASE, 12.5" DIA., 3 GAUGE, 34'-6", which will be payment in full for furnishing and installing the pole complete in place. Light standard foundations, mast arms, and luminaires will not be included in this pay item but will be paid for separately.

MAST ARM, STEEL, MONOTUBE (CDOT)

DESCRIPTION. This item will consist of furnishing and installing a steel, monotube, mast arm for the purpose of supporting traffic signals, and/or illuminated signs on an anchor base pole at the locations shown on the plans, or as specified or directed by the Commissioner. The length of the mast arm and the angular orientation of the arm relative to the centerline of the roadway will be as indicated on the plans.

A mast arm must be installed only on a 3 gauge pole, and the length of the mast arm will govern the minimum base diameter of the pole on which the arm is to be installed, in accordance with the following chart:

2

MAST ARM LENGTH (feet)	POLE BASE DIAMETER (inches)
16	10
20	10
26	10
30	11
35	12.5
40	12.5
44	12.5

MATERIAL. The mast arm must be 7 gauge steel meeting the requirements of Standard Drawing 870 and Material Specification 1454.

INSTALLATION. The mast arm must be mounted on the pole at the height specified on Drawing 834, or at a different height if specified on the plans, or as directed by the Engineer. A one inch (1") diameter opening for the installation of cable must be field drilled in the pole in line with the orientation of the mast arm. The hole must be reamed or filed to remove all sharp edges or burrs which might damage cable during installation, or through vibration when the signals are in operation. A neoprene grommet must be inserted into the finished hole prior to the installation of the cable.

Two holes must be field drilled in the pole at 180 degrees relative to the orientation of the pole for installation of locator shear pins, provided with the back plate, to prevent rotation of the mast arm. These holes must be drilled after the mast arm is in place in order that the position of the holes will match the location of the locator bushings attached to the back half of the clamp.

All signals, signs, and electrical equipment must be attached in the correct relative position to the mast arm, with service cord in place, prepared to be installed on the pole, prior to the attachment of the mast arm to the pole. The installation of the cord in the pole must be coordinated with the attachment of the mast arm to the pole. The clamp bolts must be tightened securely so that there is no slippage of the mast arm either upward or downward to exert a vertical force on the shear pins. The end cap must be secured in place with the attachment screws provided.

The mast arm must be delivered completely finished with a factory applied black powder coat per Material Specification 1454. The contractor must utilize non-abrasive slinging materials and must otherwise exercise due care in erecting the pole and mast arm to prevent any damage to the finish.

METHOD OF MEASUREMENT. This work will be measured per each monotube arm installed on a traffic pole.

BASIS OF PAYMENT. This work will be paid for at the contract unit price for each MAST ARM, STEEL, MONOTUBE of the length indicated, and will be payment in full for furnishing and installing a steel mast arm in place, complete. Attachment of signals and signs will not be part of this pay item.